PREFACE.

I HAVE written these pages as much in hope of dispelling the lamentable prejudices entertained in India against some of the most beautiful and harmless of God's creatures, as to afford an elementary treatise for the study of an interesting branch of natural history by which the weariness of Indian service may be mitigated.

I believe that this treatise will be also of use as an introduction to the splendid work of Dr. Günther on the Reptiles of British India, which is, at present, a sealed book to the uninitiated in Zoology.

The Descriptive Catalogue in Part IV., is drawn up on the basis of Günther, and for the description of those snakes, with which I am not personally acquainted, I am largely indebted to his work. The rest of the treatise is drawn nearly entirely from my own observation; it is probably less complete on that account, but I can certainly say that very little indeed is stated, for the correctness of which I cannot personally answer.

I can recommend the compact little GREEK LEXICON, published in Weale's Series, to those persons who wish to ascertain the meaning of the Greek terms used in Zoological nomenclature.

RANGOON,
7th May 1870.

INDIAN SNAKES.

AN ELEMENTARY TREATISE

ON OPHIOLOGY

WITH A DESCRIPTIVE CATALOGUE OF THE SNAKES

FOUND IN INDIA

AND THE ADJOINING COUNTRIES,

BY

EDWARD NICHOLSON,

ASSISTANT SURGEON, ROYAL ARTILLERY

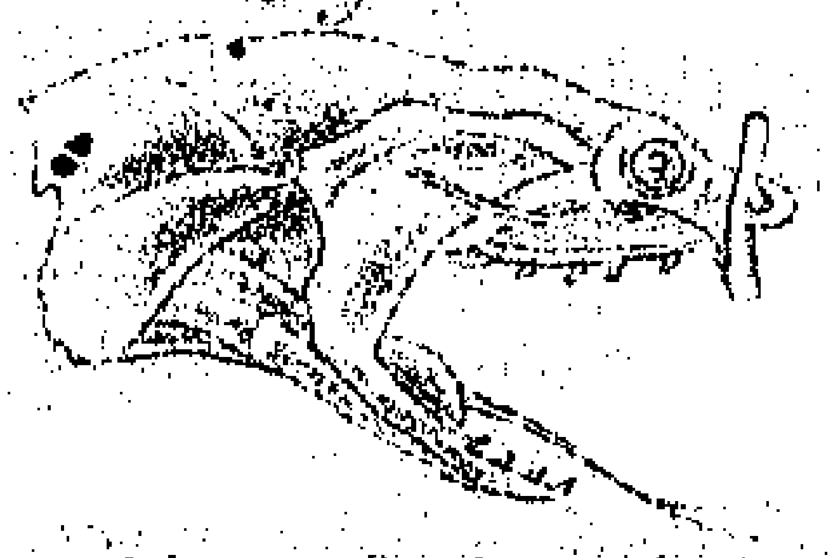
Madras:
HIGGINBOTHAM & Co.
1870.

IMPERIAL
LIBRARY.

Printed by Caleb Foster, Foster Press, 23, Rundall's Road, Vepery.

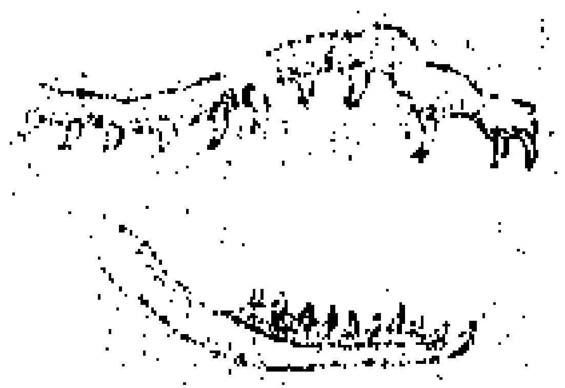
PLATE II

Fig 1.



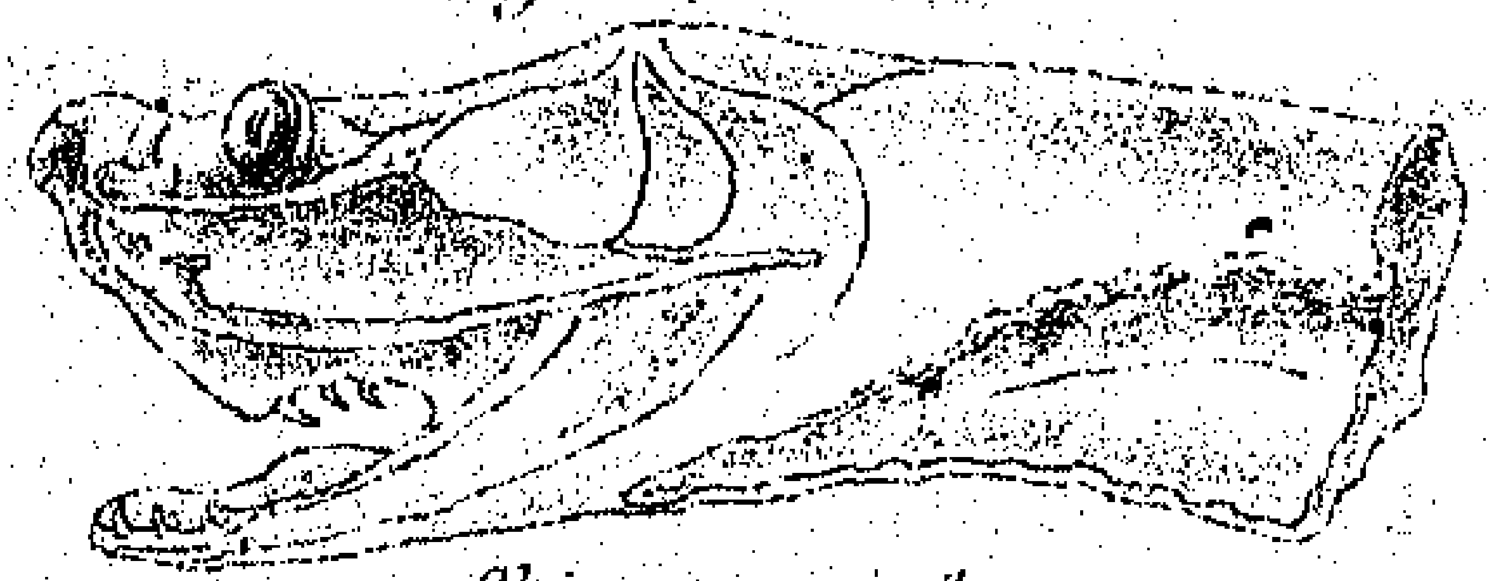
Dissected jaws of a harmless snake. (Simotes.)
The salivary gland is behind the eye.

Fig 2.



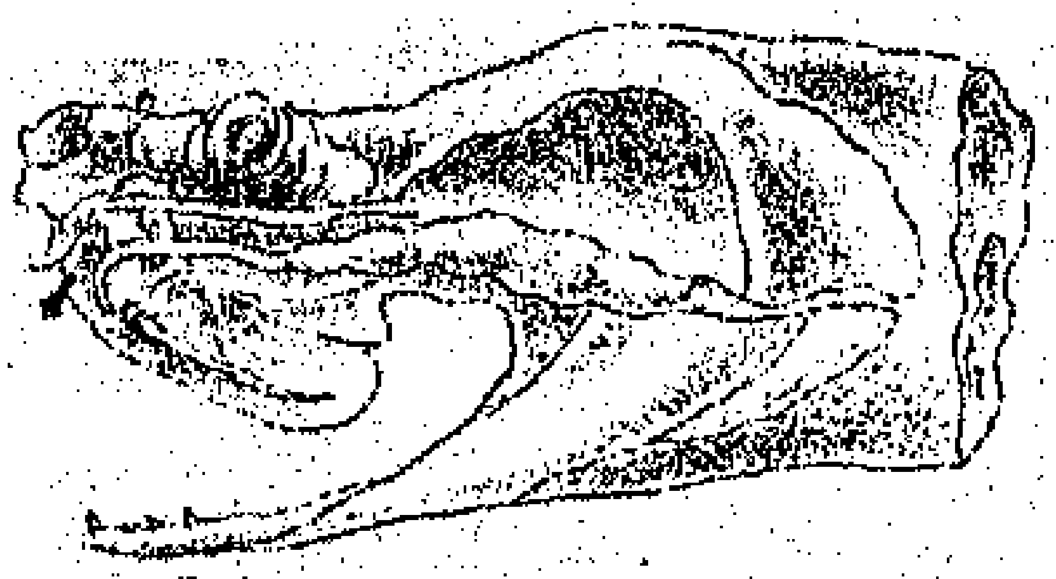
Right maxilla and left mandible of Lycodon (harmless fanged.)

Fig 3. No. 1.



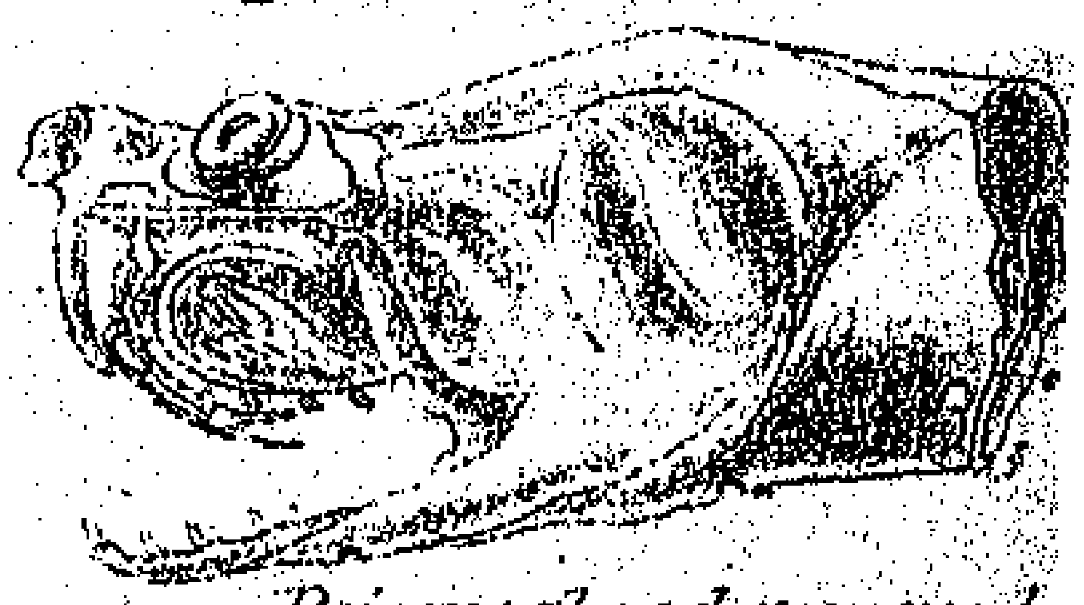
Skin removed.

No. 2.



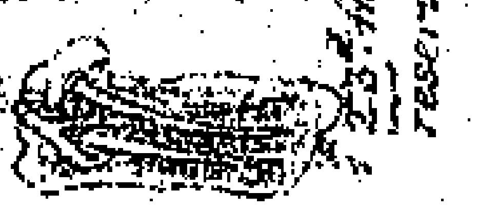
Poison apparatus exposed.

No. 3.



Poison gland removed.

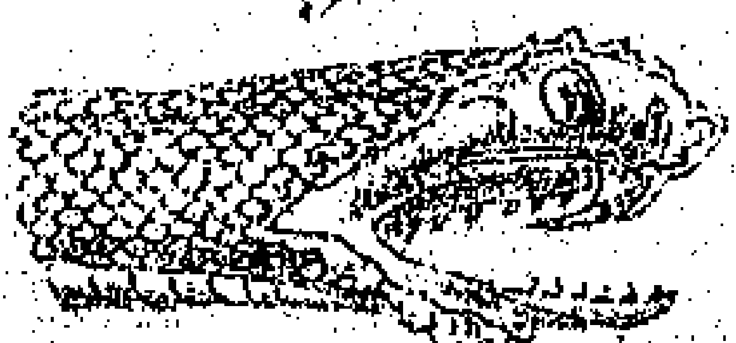
No. 2 a.



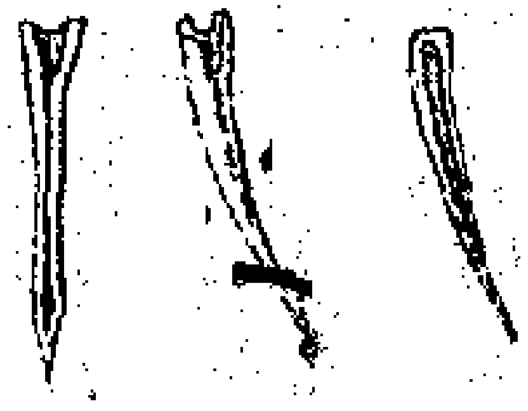
Insertion of Po[illegible] fang.

Progressive dissections of the head of a Viper (Daboia.)

Fig.



Maxilla of Trimeresurus showing the cavity occupied by the facial pit.
Poison gland and duct removed.



Poison fang of Cobra

apparatus as that which will be described of the cobra, but on a smaller scale, and though the maxillary teeth are reduced in number from the shortening of the bone, yet there remain two or three of them behind the poison-fang.

On examining the mouth of the cobra (*Naga tripudians*) we find a very marked departure from the arrangement seen in that of a harmless snake. The palatine and mandibulary teeth are unchanged, but a considerable modification has taken place in the upper jaw. Instead of a row of teeth, the maxilla shows a single tooth, of which the point is barely visible until a fold of mucous membrane which surrounds it is pulled up. Slit up this gingival fold and the fang will then be exposed; it will be seen to be fixed in very much the same position as a dog's fang, though curving more backwards, and to fit into a depression in the lower lip. Now dissect the skin off the cheek of the cobra, from the nostril in front to the angle of the mouth behind. A large flask-shaped gland will be exposed on the cheek, extending for half an inch or more behind the eye; it is continued by a duct along the lower edge of the orbit as far forwards as the nostril; a dense fibrous sheath covers the gland and forms a point of attachment to many fibres of the maxillary muscles. Cut through the duct at its beginning, just behind the eye, and a canal of very small calibre will be seen in its axis; pass a fine bristle down the canal, and by careful manipulation this probe will be seen to go to the end of the maxilla, turn downwards over it, and enter the mouth inside the gingival envelope of the fang, and in front of an orifice in the base of the fang. This examination requires careful dissecting and skilful manipulation in the *Elapidæ*, but in the vipers the arrangement is on a larger scale and much easier of demonstration.

If we now dissect away the soft parts and expose the maxilla, we shall see a great modification in its form compared with the normal type. It barely reaches as far back as the hinder part of the orbit, its shortness being compensated by increased length of the external pterygoid. A short tooth is found at its hinder part, but this is rarely perceptible until dissected down to, and appears to be rudimentary: The rest of the maxilla is flat and occupied on the lower surface by the matrix of the fang; in front, in line with the fore part of the orbit, is the socket for the fang. This part of the bone is thick and wide, and it bears, side by side, depressions for two fangs; one, the inner socket, is generally occupied by the fang in use, the other by the fang in course of growth. The new fang is generally found not yet set and then the outer socket is often open, at other times it is occupied by the newly set fang whilst the inner socket is vacant, and remains so until the new fang has worked its way inwards. Sometimes these two fangs are found perfect at the same time, then one of them, generally the inner or old fang, will be loose. This occurs at the time of casting the skin, and I have several times removed the old fangs easily with the finger and thumb or a small forceps.

The fang is slightly curved backwards and inserted at an angle so as to form a hook in the jaw. It is in shape like a short elephant-tusk and does not exceed 28-hundredths of an inch in the longest specimen I have seen. In structure it differs from other teeth in having, when fixed, two orifices communicating with the interior. Instead of a conical hollow it contains a complete canal. Both orifices are in front, the upper close to and forming part of the base, the lower at a distance from the point equal to about one-tenth of the length of the fang; a groove connects the orifices, or rather did connect them during the growth of the fang, at which time the canal, originally open in its entire length, gradually closed from above downwards. The canal only occupies the front half of the fang; the hinder part is a bony column giving considerable strength to the structure.

In the *Viperine* snakes a transition takes place, gradually culminating in the most perfect form of poison-apparatus, viz., a long fang usually lying supine along the jaw, but capable of erection by a special muscle. The genus *Trimesurus* is not nearly so complete as this, the fang is long, but there is no special muscle of erection. The maxilla consists of an open shell communicating with the exterior of the cheek. But it is in *Daboia* that we see the perfection of mechanism; on removal of the skin covering the cheek, we come at once across a strong tendon lying below the eye; it arises from the muscles of the cheek and from the fibrous covering of the poison-gland, and is inserted into the maxilla. This bone is found to be considerably modified in form; it is no longer placed below the orbit, this position is occupied by the elongated external pterygoid, whilst the maxilla, only one-fifth of an inch long (in a large Daboia) but double that in height, is placed at the end of this bone like a hammer-head at the end of its handle. Imagine the head of a hammer, with the claw downwards representing the fang, hinged at its junction with the handle, and with a string fastened to the head so as to erect at will the claw from its usual supine state; you will then have a pretty accurate idea of the mechanism of a viper's upper jaw.

In the vipers the fang is much longer than in the cobra and other *Elapidæ*, but their length has been greatly exaggerated; as it rarely exceeds half an inch in the largest specimens. It is of larger calibre also, and the poison duct is plainly seen to enter the mouth just in front of its superior orifice; the duct winds round a groove in the surface of the maxilla, and a bristle passed along its canal from behind forwards can hardly fail to pass out at the buccal orifice at the bottom of the gingival envelope of the fang.

The mechanism of the bite of a poisonous snake may differ somewhat in the viperine families from that usual with the *Elapidæ*. The cobra bites just as a dog does, the re-curved position of the fangs rendering a slip impossible; whilst the vipers, though biting also, are able to strike sideways with their long erected fangs. In either case the effect is the same. The gingival envelope of the fang is mechanically puckered up, and by its contraction forces the poisonous saliva, as it issues from the duct, to flow into the canal of the fang by its upper orifice. Muscular pressure and spasmodic action of the gland cause an ejection of poison into the fang and through it into the wound. But under ordinary circumstances, the poisonous saliva finds its way into the mouth just like the saliva of the other glands, running down the inside of the gingival fold along the outer surface of the fang. I have seen the saliva ejected by an enraged cobra in quantities which could not have passed through the fang, for experiments enable me to affirm that a cobra could not inject through the fang with more force than would be necessary to expel one drop (a minim) in three seconds, so fine is the inferior orifice of the fang. A viper, however, could inject the same quantity in half a second, and fluid may be forced through its fang in a fine stream, whilst small single droplets can alone be ejected from the cobra's fang.

CHAPTER IV.—Internal Organs.

The digestive organs of snakes are simple in arrangement. The red lane down which frogs go croaking to their grave shows but little difference between the gullet and the stomach. It is well lubricated by the mucous secretions of the mouth and throat, is capable of great distension, and occupies the greater part of the foremost half of the abdominal cavity. Digestion appears to go on principally at the lower end, where that part of the animal which was swallowed first passes into a state of solution and the rest gradually comes down as the space becomes vacant. The intestinal canal, very little convoluted, occupies the hinder half of the abdomen; the mesentery is plentifully loaded with fat, which becomes a reserve of nutriment for the long fasts which snakes often undergo. The liver lies alongside of the gullet and stomach; it is a long organ, in two longitudinal lobes, of the usual hepatic colour and texture; it reaches upwards nearly as high as the heart, and terminates below at about the same point as the stomach. The gall bladder, with the other digestive glands, is situated a little further down, at about the middle of the body. The end of the bowel opens into a short cloaca, the common passage of the intestinal canals and of the ovarian or spermatic ducts, according to sex.

The ovaries or testicles are found at the end of the abdomen, behind the intestines; when eggs are about to be laid the ovary extends at least half way up the body. The male snake has a double organ of copulation lodged in the tail (which is generally longest in males); when protruded by pressure from behind forwards it is seen in the form of two highly vascular protuberances armed with spines emerging each from a depression at the side of and behind the anus. No canal passes through these, the spermatic ducts terminating some distance within the cloaca.

The heart is situated at about one-sixth of the distance down the body. It is composed of one ventricle incompletely divided, and of two auricles (*atria*). The division of the ventricle is sufficient to enable the pulmonary and the systemic circulation to be carried on in very much the same way as in the higher classes of vertebrata. The blood is aerated in the lungs, which consist of a lacework of air-cells lining the walls of large air cavities spreading out upon the back of the upper part of the abdominal cavity. The shape and extent of these organs vary considerably; they are most extensive in the sea-snakes, a family which naturally require a large supply of air for their long stay under water. Under ordinary circumstances, snakes breathe but slowly; the amount of air in the lungs lasts them a long time, and I have frequently seen land-snakes remain under water for half an hour at a time. The air breathed by the nostrils passes through the *trachea* or windpipe, the upper part of which lies on the floor of the mouth and is closed by two cartilages which when open have a vertical slit between them; this slit is just opposite the inner orifice of the nostrils when the mouth is shut; it is the rapid expulsion of air through it which produces the hiss of some snakes when they are angry (the noise, to my mind, is more like the spit of an angry cat).

Nearly all these organs are liable to be infested with entozoa. The mouth, lungs, and gullet bear little red round worms in many kinds; but *Tropidonotus quincunciatus* is remarkable for having its intestines and abdominal cavity inhabited by numbers of small tape-worms about 6 inches in length. I believe that they are developed from "flukes" in the frog. Both the round-worms and the tape-worms permeate the muscular tissues; I have found both emerging from under the skin of the tail, both in the abovementioned snake and in a tree-snake.

CHAPTER V.—The Senses.

Sight appears to be the only sense which is well developed in snakes, at least according to the conventional standard. The scaly tegument can hardly be endowed with much sensibility; from their habit of swallowing food whole, it is probable that their taste cannot be very delicate; the nasal cavities are but little provided with expansions of mucous membrane; and hearing cannot be an important sense considering the rudimentary state of the external ear. The only remaining portion of this latter is a bone which conducts any vibrations of air that may have penetrated the scales and muscles of the head to the expansion of the auditory nerve. There is no external orifice or tympanum.

The eye is well developed in those snakes which live above ground, although it varies in size and adaptation according to the mode of life which it is destined to serve. It is covered by a transparent layer of epidermis, which is cast along with that of the general integument. It is unprovided with eyelids, and is moved to a slight extent by the usual muscles. The pupil varies in shape and size; in most snakes it is round, but it is elliptical and erect in the vipers and some of the tree-snakes, whilst in other genera of the latter it is horizontal. The iris is often tinged with various colours, yellow and green being frequent; in Lycodon, it is so black that the shape of the pupil is most difficult to see.

It is doubtful whether an elliptical or linear pupil is a sign of nocturnal habits.

In the *Typhlopidæ*, the eye is hardly visible at all.

CHAPTER VI.—THE INTEGUMENTS.

The skin is very variable in appearance. On the upper parts of the body it is a smooth soft tissue, generally white, sometimes coloured, and giving off numerous folds known as scales (*squamæ*) which overlap one another. In snakes which can expand the neck this skin is seen dotted over with separate scales. In most viperine snakes, the scales are dull, stiff, and sufficiently overlapping (imbricate) to produce a rustling noise when the skin is crumpled; in the burrowing snakes, a cuirass of smooth-polished scales leaves hardly any interval visible; in the sea-snakes, the scales become tuberculated.

On the lower parts of the body the scales become broad (in the higher types), expanding into ventral shields (*scutæ*) and, beyond the anus, into subcaudal shields (scutellæ).

On the head a few snakes have scales like on the rest of the upper parts, but the majority have the head covered with plates (non-imbricate shields) varying but little from a normal pattern, and, when varying, doing so with sufficient regularity to form characteristic distinctions.

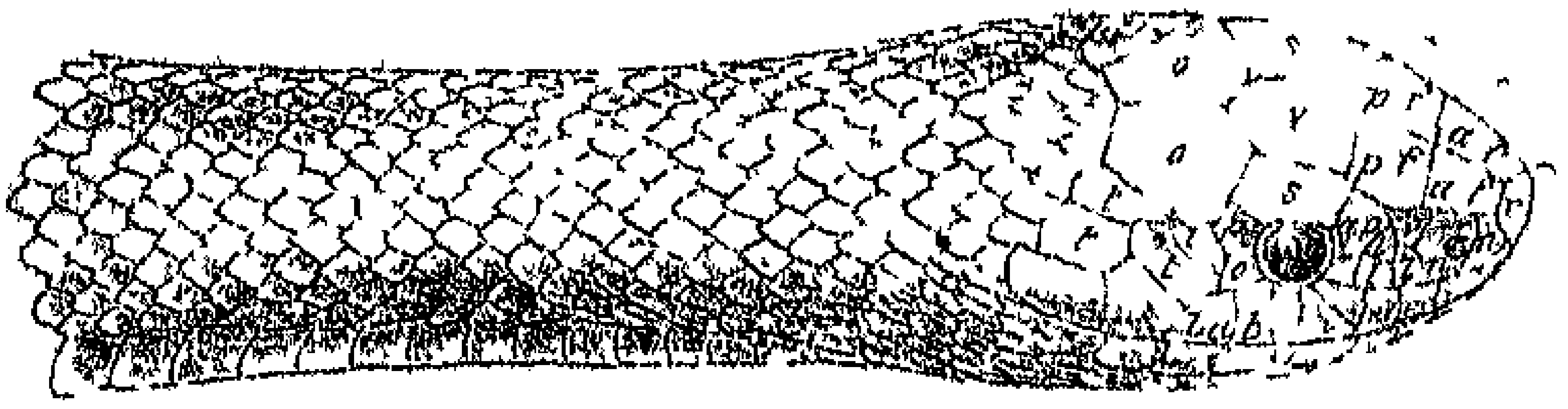
The squamous covering of these three regions, the upper parts, the lower parts and the head, afford together such a large proportion of the characters used in classification that they require attentive study.

I have before said that each pair of ribs supports and moves a ventral shield; to each also appertains a corresponding transverse row of scales. The ribs not being fixed at a right angle to the vertebral column, but raking more or less backwards, the transverse row of scales corresponding to each pair is inclined backwards in a similar manner. If this incline is at an angle of 45°, the rows of scales will be crossed by lines at an equal angle in the opposite direction; the scales will be of a rhombic or lozenge shape, and the rows capable of being counted in two cross directions. But if the ribs be inclined at a slight angle to the spine, then the scales will be nearly square; whilst an excessive incline causes them to be rhomboidal or elliptic, and the rows to be more or less longitudinally inclined. In the neck of the cobra, for instance, the ribs lie down like the ribs of an umbrella, the scales are consequently arranged in such acutely inclined rows as to become quite linear and imbricate; when the snake raises the ribs, expanding the skin of the neck into what custom calls the hood, the scales are seen dotted like long grains of linseed on the stretched surface.

The number of scales in each transverse series varies with great regularity. The extreme range is from 12 to 75 or

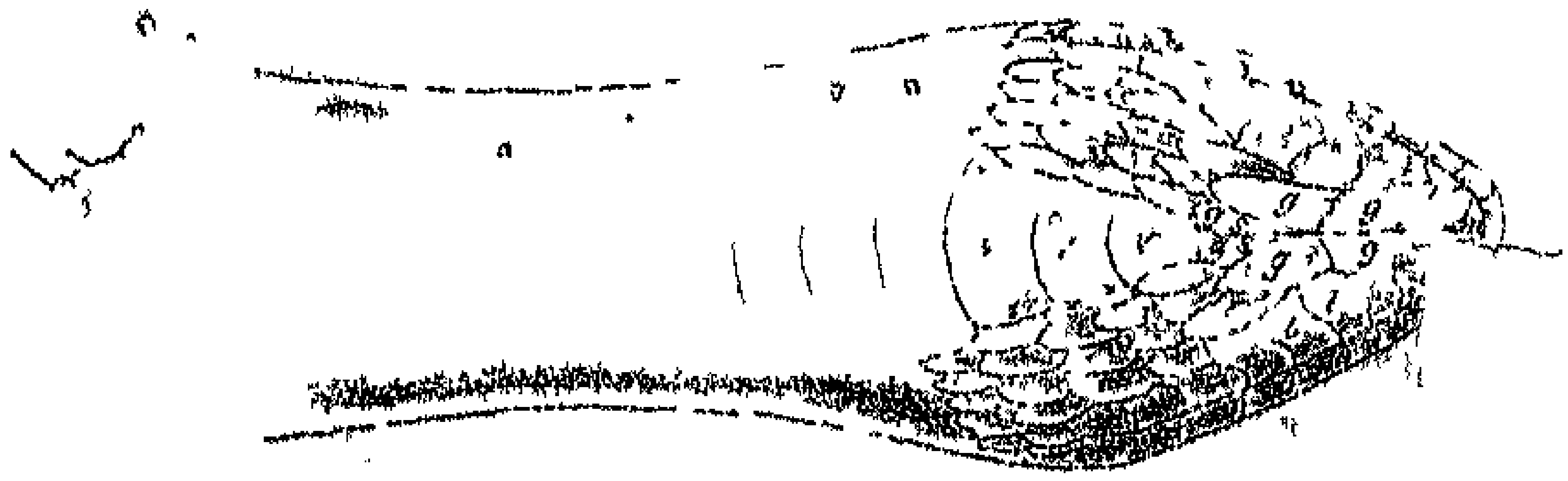
PLATE 1

Normal arrangement of Head Shields / Ptyas Mucosus /



o o Occipitals
v Vertical
s s Supraciliaries
p.f Posterior Frontals
a f Anterior Frontals
r Rostral

n n Nasals
L l l Loreal (triple)
a o Anteoculars
p o Postoculars
l a b Labials 8, [illegible]
t Temporals 2 + 2.



l l Lower Labials
m Mental.
g g Gular Shields / chin shields /

g s Gular scales
v v v Ventrals

lo
lat
ent

entral

LIBRARY

thereabouts, but 13 to 25 are the most general numbers. In conjunction with other characters, the number of scales in each transverse series, or, as it is commonly called, the number of rows (longitudinal)* of scales is a valuable distinctive character, as it is comparatively rare that individuals of the same species should have a different number of rows.

This number is nearly always uneven, the vertebral row being *azygos,* and often of a different shape; in only two genera (*Zaocys* and *Peltopelor*) is there a double row of vertebral scales, and consequently an even number in the transverse series. The number of rows should be counted at a distance from the head equal to about one quarter of the length of the body† as the number on the neck exceeds the normal number by two or more, the number settles down at a point varying from the tenth to the thirtieth ventral shield, and remains constant for, at least, half way down the body; then sooner or later the scales begin to diminish, always in uneven number, down to the root of the tail. There several rows may be observed without corresponding ventrals, three or four of these being rudimentary or deficient where the anal orifice is covered by its large shield. The number of scales on the tail is nearly always even, beginning with about ten and diminishing by pairs to four or two.

In some snakes, the number of rows of scales settles down very soon to the normal number which continues till very near the tail, in other snakes barely four-tenths of the trunk is occupied by the normal number. Thus in *Bungarus fasciatus,* the number of rows settles down, at about the tenth ventral, to the normal number 15, and remains at that right down to the vent; but the more common arrangement is shown in the following diagram, dividing the body (not the tail) of a snake with 19 rows of scales into tenths :—

---

* The number of transverse series is not counted; the number of ventral shields is practically more constant, and is stated instead.

† In the sea-snakes, the number on the neck is most constant.

Tenths.		1	2	3	4	5	6	7	8	9	10	Tail		
No. of rows	21	19	19	19	19	19	17	17	17	15	10	8	6	4

We have seen that the scales may be more or less overlapping or *imbricate*; another important character is the presence or absence of a raised keel along the centre of each scale. This keel is very capricious in its presence or absence, and does not depend on the habits of the snake. It is found in ground-snakes, in water-snakes, and in tree-snakes, indifferently, and in each of these groups, the snakes with smooth scales do just as well as those with keels: the history of the keel is not known. These keels are generally strongest on the dorsal rows, and they become faint towards the abdomen, and rarely appear on the outer row of scales. This row is generally of larger size than the others.

The presence of an opposite feature—grooves—is frequently noted; they are far from obvious, and are only visible by reflection as one or two minute gougings at the apex of the scales.

The ventral shields are narrow at their first appearance between the chin shields; the first one or two are often bifid, and as many as ten to twenty rows of ordinary scales often intervene. (All those scales which intervene between the last pair of chin shields (q. v.) and the first undivided ventral are called gular scales). The ventrals are absent, rudimentary or narrow in the burrowing snakes, the grovelling snakes, the pythons and the sea-snakes, whilst they are most developed in tree-snakes and others of active habits. In these latter they become broad, turned up at the sides, and often have two lateral keels so well developed as nearly to divide them into three sections. The last of the series is the anal shield; it is sometimes bifid, and this character, when it occurs, is very regular. Still more regular is the single or double (bifid) condition of the subcaudal shields; they are generally double, being divided down the centre by a zigzag line.

The head is covered with scales like on the rest of the body, with large plates of regular form or with various gradations between these two classes of covering.

In the greater number of vipers, there is no trace of the regular-shielded crown possessed by the majority of snakes; the *Erycidæ* and *Acrochordidæ* have also scaly heads; the burrowing snakes have an incomplete shielded covering. In two snakes of very opposite habits, the head-covering is composed of large scales simulating the arrangement of shields; *Xenopeltis unicolor*, a burrowing snake, and *Peltopelor macrolepis*, a tree-viper, both solitary species of their genus, have large triangular scales occupying with tolerable regularity the place of the head-shields.

The head-shields appear to have formed round a central shield, the *vertical*, which is always of a shape departing but little from the form of a pentagonal heraldic shield, base in front, apex behind. Behind this, are the two *occipitals*, large, elongated, and either rounded or truncated behind. In front of the vertical are two pairs of shields, the *posterior frontals* more or less square, and the *anterior frontals* of similar form, but smaller and liable to encroachment in front and at the side. On either side of the vertical are the two *supraciliaries*, of very regular and of crescentic shape, shading the eyes.

These four pairs of shields with their centre, the vertical, *form the crown; the other shields are on the sides of the face.*

The muzzle is covered by a convex triangular shield, the *rostral*, which often extends up a little way between the anterior frontals; it is broad at its base with a slight chink in the middle for the exit of the tongue without the mouth being opened.

Behind the rostral on either side is a double series of shields, one above the other; the lower series are the *labials, (upper)* varying ordinarily from five to nine in number, and increasing in size from before hindward. One or more of them enter the orbit when there is no subocular. The shields between the labials and the crown on either side are the *nasals*, the *loreal*, the *oculars*, and the *temporals*. The *nasal* is sometimes single being pierced by the nostril, but more frequently there are two nasals with the nostril between them. In the water-snakes, both river and sea, where the nostrils are superior, the nasals of either side are often contiguous, excluding the anterior frontals from contact with the rostral. The *loreal* is absent in the *Elapidæ*, and in some of the harmless colubrine snakes it is merged into the anterior oculars or the frontals. It is generally present, and, in some snakes, it is double or triple (*Ptyas, Zaocys, Herpetoreas*). Sometimes it wedges itself between the anteoculars into the orbit. The *anteoculars* are variable in number; one or two is the usual number; the upper is generally the larger and often reaches on to the crown, and more rarely as far as the vertical; the lower is smaller and often seems to be a fragment of a lower labial. The *postoculars* number usually from one to three, and extend lower down than the anteoculars. The lower border of the orbit is sometimes occupied by a subocular, but this completion of the orbital ring is rare (*Zamenis*, certain *Homalopsidæ*, *Amblycephalidæ*); the rule is for one or more labials to enter the orbit. Behind the postoculars are the temporals, variable in number, shape, and arrangement. They are counted backwards in vertical rows; thus 2 + 2 + 3 temporals means that behind the postoculars are two shields one over the other, then come two more similarly placed, and lastly a set of three.

These temporals are very transitional to ordinary scales. In one snake (*Ophiophagus*) the temporals join in a complete ring round the occipitals by the addition of two large shields behind them.

The shields covering the lower jaw are also regularly arranged. In front, corresponding to the rostral above, is a single shield, the *mental*, and from it the *lower labials* go backwards as in the upper jaw. The pair of first labials nearly always meet in the median line behind the mental, but the other lower labials are separated by two pairs of longitudinally disposed chin shields* one behind the other. The chin shields of either side are separated by a tolerably deep *mental groove* in all but the lower types. One or more pairs of scales (*gular scales*) usually intervene between the chin shields and the first ventral.

This arrangement of head-shields is sketched out in the skinks, a family of lizards of very ophidian form and feeble limbs; but the lowest type of snakes, the *Typhlopidæ*, strangely enough have a totally different arrangement of head-shields, (see description in Part IV). Redundancy of head-shields is comparatively rare; the multiple shields may be increased or diminished in number, but the intercalation of abnormal shields is not often met with. *Zamenis diadema* and the Pythonidæ offer almost the only examples of redundant shields on the crown. Sub-division of shields often occurs, but very rarely is the character constant; it is usually an individual eccentricity to be commonly found in certain species.

The colour of the integument is generally resident in the scales, although it frequently happens either that the true skin partakes of the colour of the scales or that the scales shows between their edges the ground colour of the skin beneath. This skin is usually white, but black cross-bands on it are not uncommon, as also reticulated patterns in yellow, red, or pale blue. The two latter colours come and go in the same manner as the colours of a turkey's wattles, and are often interchangeable in the same individual. (Ex. *Tropidonotus stolatus*). The scaly coat has generally a ground-colour of olive brown in various shades and tints. Other colours also commonly occur, black, brown, yellow, green, white and more rarely red and blue. Green is the usual colour of tree-snakes; it is very delicate, and rapidly passes through changes from tender green to bronze and blue. In a few cases the colours are dull, but generally they are iridescent in certain lights, and afford a beautiful play of colours.

---

* Or rather *gulæ* shields in order to obviate the ambiguity of the terms 'mental' and 'chin' shields when expressed in Latin.

The patterns in which these colours are arranged are often very difficult to describe, and there are, I should say, few artists skilful enough to paint a drawing of a snake from a written description of the colours and pattern. The entrance of an interstitial pattern from the skin below, the secondary patterns produced by dark tinged margins to the scales, and the play of colours in different lights, sorely tax the word-painter's power of description.

The patterns are formed by stripes, series of dots, of ring-spots, of ocelli or of other shaped marks in a longitudinal or in a transverse direction, or in both. The longitudinal pattern may cross the transverse pattern or *vice versâ*, and the points of crossing may be marked by another pattern. These markings rarely extend round the body, except in a few snakes encircled by rings; generally the under-parts are of a different pattern, plain, mottled, banded, or spotted. *The throat is also of a different colour, lighter, often yellow.* The head is sometimes marked with fillets, and streaks frequently pass obliquely backwards from the eye to the throat. Collars are very common, either >shaped (point forward) or < shaped (point backwards). Cross bars are often ocellate, that is, including eyes in their course, and a *fasciolated* pattern is common; it consists of cross bars of variegated colours produced by darker or lighter tips to certain series of scales.

I have not yet been able to ascertain the exact period at which snakes cast their skins, but I think that about two months is the average interval between each cast. At the approach of the casting, the colours of the snake become somewhat dull, and a white film is seen over the surface of the eye. When the skin, or rather the epidermis, (for it is the colourless scarf skin which separates, like in human beings after an attack of scarlet fever,) is ready to be cast, the snake rubs the skin back from his nose and chin, and seeks some projecting point such as would be afforded by a split bamboo, some stiff thatch, or a heap of stones, on which to catch the loose skin; perhaps adhesion is aided by the application of glutinous saliva; anyhow the snake manages to stick the loose skin of the nose and chin to some convenient object, and then proceeds to peel himself out of his integument, which, of course, remains inside out like an eel's skin after the involuntary exit of its tenant—with this difference, that the snake has had numerous opportunities, denied to the eel, of becoming used to the process. The cast skins are beautiful objects, there is often not a break in them from nose to tip. The epidermal covering of the eye comes off along with the rest of the skin, and every scale, every keel is distinctly marked; colour alone is absent,* but even without it the kind of snake to whom the skin belonged can often be identified.† They are very delicate and fragile, and are liable to destruction by mites unless kept along with camphor.

---

* The pattern of the Python is visible in his cast skin.

† When I was stationed at Kamptee in 1868, the house I occupied, jointly with a brother-officer, also gave shelter to a Cobra and a pair of *Bungarus arcuatus*. I never saw them, but easily identified them by the skins they periodically cast. I could not find out where the cobra lived; the other snakes lived in a hole in the wall under my dressing table.

PART II.—NATURAL HISTORY.

Chapter I.—The Snake at Liberty.

We have but little knowledge of the habits of snakes when at liberty, owing to the difficulties attending the observation of such animals in tropical climates;[*] vigilant and patient, they mostly remain during the day in a state of repose, seeking their prey at those hours when most animals have relaxed from their usual watchfulness and are seeking shelter for the night. Whether ground or tree-snakes, they remain patiently in the same attitude until their prey approach, then, gently gliding over the short distance which intervenes, they pounce on the unsuspecting victim. The approach is so imperceptible that doubtless a certain amount of curiosity must often fix the attention of animals on perceiving the snake for two or three seconds before they become aware of their danger; but of fascination as it is called, there is none.

The habits of snakes are so retiring and so little apt to attract attention, that they rarely obtrude themselves on our notice. The only occasions on which we observe them are when they imprudently venture near our habitations, or when the eye of the sportsman is quartering the ground anxiously for the first movement of snipe or quail. At other times, they generally elude notice; unless a European has sharp sight and habits of unconscious observation of what is going on around him as he walks, he may live for ten years in Indian stations without seeing as many live snakes otherwise than in the hands of the juggler. My own experience is hardly a fair criterion as I am very short-sighted; I cannot, therefore, attach much importance to the fact that I have never yet come across a snake accidentally; although, when I go out snake-hunting, keeping a sharp look-out, I rarely fail to bag a specimen of some sort.

---

[*] From the eagerness of people to look for the marvellous in all that concerns snakes, the observations of non-scientific enquirers are always open to suspicion. On this subject, the safest plan is to believe nothing that you hear, and only half what you see.

The rainy season is the time when snakes are most lively; in the hot and dry weather they retire to cool and moist places. I have not found that season influences either the shedding of the skin or the laying of eggs, but with respect to the latter act I cannot be certain. I have found that the cobra's eggs are generally laid in the rainy season, whilst *Tropidonotus quincunciatus* lays in January or February. The eggs are not laid for about three months after impregnation; they are of the usual oval form, and have a soft white parchment covering; they are generally deposited in a mass of decaying vegetation, occasionally in sand, and I am informed on trustworthy authority that the hamadryas (*Ophiophagus*) has been found coiled on a nest of evidently artificial construction. The eggs laid in strings and adhering together as usual were deposited on, and covered by, a layer of wild plantain shrubs, so as to afford protection combined with the heat and moisture of decaying vegetation. I have in vain endeavoured to hatch the eggs of snakes that had laid in captivity. Whether I removed them to a place of equable temperature, or placed them in a moist heat or left them in the pot for the mother to look after, the result was the same. Snakes appear to watch over their eggs, but I do not believe that they impart any warmth to them. The eggs that I left under a snake for three weeks were as hard and shrivelled when I removed them as those which I had taken away; heat and moisture are evidently needed for the development of the embryo, as the thin membrane which serves for a shell allows evaporation to take place very quickly. The number of eggs laid vary from twenty to thirty. Some snakes are viviparous, the sea-snakes for instance; others are ovi-viviparous, that is to say, that the young are fully developed when the eggs are laid and speedily effect their exit; but the great majority of snakes are strictly oviparous. With reference to the story of snakes offering their young a temporary refuge in their stomachs on the approach of danger, I cannot offer an opinion of any value, never having seen or heard of it in India; there is nothing impossible about it, as the young snakes could certainly do without air for half an hour, and a snake's stomach is sufficiently capacious to allow a frog to croak *de profundis clamavi* when he evidently occupies a position about two feet from the daylight.

Snakes feed upon small animals of any description as long as they are of proportionate size. Frogs are the principal food of the large and middle-sized ground-snakes, toads do not come amiss to them; rats, birds' eggs, and mice are also favourite articles of food, whilst young birds, lizards, tree-frogs and grasshoppers are the food of the tree-snakes. The water-snakes live on fish, and the amphibious land-snakes catch the fish which inhabit the mud of the paddy-fields. A large python might possibly manage a kid or a fawn of the smaller species of deer, but the stories of their swallowing goats, stags, men, and oxen are pure travellers' tales. Many of the burrowing snakes live on worms and other insects, and some snakes actually live on their brethren, at least on other snakes; they are probably hard up for food at the time. There is no reason why a snake should not swallow another snake nearly as big as himself if he gets the chance; I have seen two snakes who had caught the same frog between them manœuvre very cleverly when their noses met; the one who got his head within the other's jaw would certainly have gone down along with the frog if he had not freed himself from the frog and the snake too by a sudden effort. When young, snakes live on larvæ, flies, young geckoes, and other lizards until they are big enough to manage the usual prey of their species.

Snakes drink water freely; I have frequently counted above a hundred gulps of water go down before the drinker was satisfied. I have never succeeded in inducing a snake to drink milk, though, when water was afterwards offered, it drank eagerly. The stories, ancient and modern, of snakes' sucking cows' teats and robbing dairies would appear to be without foundation.

I am incredulous of the stories commonly received concerning the manner in which snakes are said to kill their prey, viz., by crushing it in their folds. The pressure which the largest snake can exercise is very mild indeed, just sufficient to hold their prey if necessary and prevent it escaping; the only inconvenience of having a nine-foot python or hamadryas coiled round one is that he is apt to make a mess on your clothes. Neither do snakes lick their crushed prey ('slaver it over' is the term used in story and simile) before swallowing it; if the prey is active, after catching it with their teeth they throw a few folds round it simply to prevent it from struggling, and then bolt it just as they would a frog.

CHAPTER II.—THE SERPENTARIUM.

The collector of snakes must study their habits if he wishes to be successful in his search for specimens;—and I can only give a few indications as to the likely places for them. Dry nullahs leading down to tanks are a good find for amphibious snakes such as the *Tropidonoti*; tussocks of grass in wet paddy-fields often afford shelter to the ground vipers; the neighbourhood of houses is affected by Lycodon; the old galleries of white ants' nests are the refuge of various kinds of snakes, cobras included; and the hollows of old trees containing decaying vegetable matter are often chosen by snakes as a nest for their eggs. But the European in India can do little himself beyond keeping a sharp look-out whilst walking for exercise or after game; by far the greater part of collections are made by employing the patience and acuteness of natives in this laborious pursuit. In stations where a reward is given by the authorities for every cobra that is killed, other snakes will often be brought in, and an arrangement with the police will bring these to any one willing to give a small reward. But the best way is undoubtedly to make generally known amongst toddy-drawers, grass-cutters, fishermen, and native followers in general, that a reward will be given for every snake that is brought in, varying in amount according to the rarity of the snake, whether it be in good condition, and alive or dead. By giving an extra reward for live specimens, all unnecessary destruction of life will be avoided, and as in most cases the snakes brought in would have been killed out of malice or fear, the reward can hardly be said to incite to the destruction of snakes. Nay, a few words of explanation to the people who usually bring snakes will teach them the difference between the harmless and the poisonous snakes, and either direct their attention to those which are wanted for observation, or divert their attention from the more common species.

I may here observe that natives of India, of the South at least, know nothing about snakes, have no names for them, and can give nothing but erroneous information. If you do not know Tamil, it is useless to ask natives for the name of a snake; you will simply obtain a polysyllabic compound of the word *pambū* with about as much meaning in it as the stupid 'whip-snake' and 'carpet-snake' of the Anglo-Indian vocabulary. If you possess the rare accomplishment of knowledge of some language of the South of India, manufacture your own names for the snakes, as I have been obliged to do in English for the more common of those described further on. In Hindustani, there are but three names of individual snakes which are at all recognized: 'Nāg samp,' the cobra—'Dhaman,' *Ptyas mucosus*—and Ajgur, the python. The natives of Burmah are far more intelligent in ophiology; the cobra, the hamadryas, the dhāman, the chain-viper, the black-striped red dhāman, *Compsosoma*, have all names in the Burmese and Karen languages, and the people are well acquainted with their habits.

Some snakes allow themselves to be caught without the slightest attempt at resistance. The gentle *Tropidonotus stolatus, subminiatus*, and *plumbicolor* allow themselves to be taken up, and in dry weather the offer of a drink of water will at once gain their heart. But most snakes are strongly opposed to being captured, and some show their independence by snapping viciously. *Tropidonotus quincunciatus* and *Ptyas* both fight for their freedom even at the earliest age, and, though they resign themselves philosophically to a domestic life, are always a little uncertain to handle; their bite is, however, quite harmless, and by no means painful.

The collector need provide himself with no implements beyond his walking stick, which, if placed on the neck of any snake, will permit of its being grasped without trouble. If the specimen has to be carried any distance and is too large to be stowed into a pocket, a piece of string to bind him to the stick will be found useful, as holding a large snake by the tail is inconvenient, and holding him by the neck becomes irksome, especially in the case of a venomous kind. It must be remembered that the great mobility of the maxillaries will often enable a snake to turn round on your fingers when you think he is quite secure; therefore, take care to place your finger and thumb on either side of the neck, never above and below it.

A cobra standing at bay can be readily captured; put the point of a stick gently on his head and bear it down to the ground by a firm and gradual pressure; he will not resist; then place the stick horizontally across his neck and take him up. You must not dawdle about this; sharp is the word in dealing with snakes, and they have as much respect for firm and kind treatment as contempt for timidity and irresolution. When, however, an active snake carries on a running fight, the only way to capture him is to give him a tap across the back sufficiently hard to take the go-out of him without injuring him. If you wish to capture your specimen alive, err rather on the side of mercy and see how gentle a blow will suffice to put him *hors de combat*. Even if you want the snake for the museum and not for the menagerie, it is important to secure him with as little injury as possible.

The juggler or snake exhibitor keeps his snakes in flat baskets of just sufficient size to hold a cobra when coiled up. However convenient this basket may be for portability and exhibition purposes, it is not suitable for other snakes than the cobra, and it is only admissible as a temporary lodging. The best habitation for snakes would doubtless be a verandah fenced to a sufficient height with wire gauze; it might be divided into compartments in order to separate snakes of ophiophagous habits from the rest of the community, and be provided with water and shrubs sufficiently to gratify the desire for coolness and shade. Such a serpentarium would enable interesting observations to be made on the habits of snakes. The floor should be strewn with sand; it will not often require renewal owing to the inoffensive nature of the uric acid excreta of snakes.*

Next to the above arrangement, the best serpentarium consists of wooden boxes, old wine cases, in which the wood is re-placed as much as possible by glass and wire gauze or perforated zinc. A flat-bottomed pan of water should always be kept in the box, for not only do snakes drink freely, but they also like the cool shade to be enjoyed by coiling themselves close round the pan. If a small chatty of water be also given them, some snakes will proceed to inhabit it. It will not be uncommon to see half a dozen *Tropidonotus quincunciatus* coiled down comfortably in the chatty of water and staying there for days together; a head coming up occasionally to breathe, and sinking down again directly.

A few pieces of brick must also be provided in order to facilitate the periodical casting of the skin; failing these convenient points of attachment, the skin will come off in fragments instead of being cast in its integrity.

To take a snake out of the box, when he is not sufficiently domesticated to be taken up with the hand, lift his body with a hooked stick, and, as his tail glides over it, take hold of it and deposit him on the floor or in a spare box. If you wish to tame the snake, he must be taken out daily and gradually accustomed to being handled; if you could persuade him to drink milk, the offer of it would become a great inducement to good behaviour. A cobra must always be taken out daily and gradually tired out of his wildness, but in the intervals of his performances he should be left alone and not worried. There is very little danger about handling this snake; nerve is all that is required. I have very little of it myself, and can never handle venomous snakes with confidence; I have often envied the nerve of a friend in Rangoon, who, emboldened by the possession of an antidote in case of accident, handles cobras with perfect freedom; he puts his hand into a narrow-mouthed basket containing several cobras, and picks out the one he wants without the slightest objection on the part of the snake beyond the usual hard swearing.

---

* Snake's dung was, some years ago, of some value; about three shillings per lb. was the price, if I remember right; it was used for the manufacture of *murexide*, a brilliant purple dye. Aniline has probably beaten uric acid out of the market by this time.

When the cobra is on the floor, squat down before him and bring him to attention if he is making tracks, by a smart smack on the back; then, by a side-to-side movement of the knees or gently moving in front of him a piece of chalk held in the left hand, he can be kept steady for a long time, following your movements. If your attention relaxes, he calms down and backs away; catch hold of him by the tail or smack him on the back, and he will come to attention again. Keep him occupied with an object in front of him, and you may do anything to him; place your right hand above his head, and you can bring him flat to the ground, swearing hard, but without any attempt at resistance. After he has stood up for some time, it is easy to provoke a strike; this, however, is rarely done viciously, and the injury inflicted is generally confined to his own nose; most captive cobras have their noses barked raw from frequent hits against hard substances.

The country music played by snake-charmers during the cobra's performance is, I need hardly say, quite superfluous, and it is highly probable that, far from enjoying music, he has very little appreciation of sound. The Burmese do exactly the same tricks with snakes, without the aid of music, and also without extracting the snake's fangs, a precaution generally taken by the Indian juggler. I believe that these men not only take out the fangs, but, aware of their reproduction, cauterize the fang-matrix; for, in some escaped cobras which I have in my collection, there is not a trace of fang or matrix.

The small red ants which infest some houses have often given me much trouble; they will attack live snakes, and I have several times found of a morning valuable specimens killed, and their skins seriously damaged. The only remedy for this is to isolate the boxes from the floor by pieces of wood saturated with a solution of corrosive sublimate. The boxes should be examined daily and any casualties transferred to the museum.

A feast and a fast is more the custom of snakes than frequent feeding; their prey is generally sufficiently large to afford their digestive organs exercise for several days, and, during this time, they take their ease lying in wait for another meal. The possibility of keeping snakes in captivity entirely depends on their temper; some snakes feed readily, others are sulky and obstinately refuse food. Amongst the latter are cobras; I do not know how they manage with them in Zoological Gardens, but I have never seen a cobra feed, and I think that, unless fed by force, he will starve himself to death. The chain-viper *Daboia* is very sulky, and will live for four or five months without food; the cobra though will not survive his voluntary starvation for more than a month or six weeks. Jugglers, I believe, either feed their cobras with liquid nourishment, or else let them loose when their lives are endangered; probably their experience in snake-catching enables them to re-capture their prisoners at a future time.

If a snake will not feed himself after being two or three weeks in captivity, he must be fed. The most convenient food for the purpose is fish; catch the snake by the neck, the finger on one side, the thumb on the other; present the head of a convenient-sized fish to him, he will easily be induced to make a bite at it, then force it down his throat, guiding the tail with a forceps when it comes within range of the teeth. I need hardly say that the fish should not be cooked, and need not be alive. If the snake, on being released, throw up the fish,* you must begin again, and give him two fish (on the chance of his retaining at least one) and coax them gently down his gullet. Leaving the back-fin untrimmed may also mechanically prevent the rejection of the fish.

Most of the ground colubrine snakes feed freely in captivity; *Ptyas mucosus* especially is very eager at his food,† and will bolt frogs of very large size. I feed these kinds of snakes once a week; I put two frogs per snake into the boxes, and let them divide the total number amongst themselves. Pythons need only be fed about once a month; big frogs, chickens, or bandicoots are the best food for them.

CHAPTER III.—THE MUSEUM.

The collector will rarely be obliged to kill a snake for the purpose of examination. He will generally have quite enough snakes brought to him dead, and most snakes can with very little trouble be identified while alive; he will only have to kill snakes when they are quite new to him or are rare specimens worthy of preservation. The best way to kill a snake is to poison him; interesting experiments may be made by causing him to be bitten by venomous snakes, but the easiest and least painful way is to put him in a sufficiently large bottle and pour in a few drops of chloroform. If the quantity of vapour produced be sufficient to saturate the air in the bottle, the snake will be insensible in a few seconds, and, if left in for ten or fifteen minutes, will be quite dead. If taken out directly insensibility is complete, the anæsthesia will remain for an hour or more, and then pass away without injury to the snake; but this temporary anæsthesia should, of course, be avoided Another convenient way of killing a snake without injury is by blowing into his mouth a drop or two of the oil from a dirty tobacco pipe. Nicotine can, of course, be manufactured for the purpose, but a small bottle of essence of tobacco is readily procured from the kind contributions of pipe-smoking friends, and is quite as effectual as more elegant preparations. Do not commit the cruelty of putting a snake alive, into a bottle of spirit, for as long as a bubble of air remains in the bottle the snake can breathe, and the death is a most lingering one.

---

* A snake on being captured generally throws up any recently ingested food, and some timid snakes must not be disturbed after their meals lest their digestion be deranged in a similar way.

† My attention was once drawn by the cries of four Malabar weaver-birds (*Ploceus baya*) who were in a cage in my verandah. On going out I found that a large Dhaman had lifted the lid of his box, carelessly left unfastened, and had got out; but instead of making instant use of his liberty, he could not resist the temptation offered by this cage of birds, he insinuated himself between the bars, and was bolting the second bird when I came to the rescue; he caught hold of the third before I could secure him again.

When you have your dead specimen before you, you can take down its description, diagnose it, draw or paint its portrait (a plan strongly recommeded to officers who are disinclined to trail large bottles of specimens about the country) or even photograph it; but photography is not, I find, a very successful delineator of snakes, and it does not give the slightest clue to the pattern of their coloration.

Either the whole snake, or merely its skin, may be preserved; of stuffing I do not speak; perhaps, on their arrival in England some cunning taxidermist may be able to make something better than a hideous sausage of your snake skins, but that is beyond the limits of my subject. I intend at some future time trying to preserve snakes entire by substituting glycerine with antiseptic substances dissolved in it for the fluids in the body, but I have yet only partially carried out my idea. I have some heads of venomous snakes, with the poison apparatus dissected for demonstration, which were preserved nearly a year ago, and they are now quite inoffensive and perfectly fresh and moist.

They were merely soaked for a week in glycerine mixed with an eighth part of carbolic acid, drained, wiped dry, and put in a stoppered bottle. I take them out occasionally for a few hours and re-place them in the bottle when I have done with them; they promise to keep for any length of time.

This process apart, the two methods available for the preservation of snakes is by putting them bodily into spirit of wine or by preserving the skin only. Large snakes do not usually keep well in spirit unless they have been cleared of their internal organs.

Tree-snakes are particularly difficult of preservation, and, however great care be taken, their beautiful colours generally fade, and their epidermis peels off in a very annoying manner. Bright light is fatal to the colours; the bottles should be kept covered up from the light or an uniform dirty white will soon be the general colour of the collection.

If the snake is known by experience to be perishable in spirit, it should be slit up and the whole of the interior removed, otherwise a few incisions into the abdomen to let the spirit penetrate every where will be sufficient, especially in the case of small specimens.

It should be removed to a permanent location in fresh spirit after a week's soaking in the first or depôt bottle.

The spirit should be strong, from 40 to 60 degrees O. P. (sp. gr. ·870 to ·825) brandy or arrack are not nearly strong enough. When rectified spirit is not procurable, common arrack may be concentrated to the desired strength by the addition of quicklime, or of potash, (pearl-ash, carbonate of potash, *not* bicarbonate)—or even by the old process of putting the spirit into fresh bladders and hanging them up until the volume is reduced to about one-half.

Unless the stoppers of the bottles fit very accurately, it is well to prevent weakening of the spirit by sealing the stoppers with soft wax.

If you wish to show the teeth or poison apparatus of a specimen, its mouth must be kept open with a gag before putting it into spirit, as otherwise you will find it a matter of no small difficulty to open the mouth after the muscles have become rigidly fixed.

I think that the best collection is that where there are two specimens of each snake, one in spirit, the other consisting of the skin only; it is well to avail oneself of a leisure day to dissect and skin a duplicate specimen instead of simply popping it into a bottle.

Begin by dissecting the skin from off the head, taking care not to cut further down than the subcutaneous tissue if you want the head for subsequent dissection. Slit the snake down from chin to tip with a pair of sharp scissors, keeping carefully in the median line of the ventral shields; separate the skin carefully as far back as possible on each side, and then take off the skin from the head downwards, relieving the tension by frequent strokes of the knife on the subcutaneous tissue. When you have skinned as far as the vent, the skin must be carefully separated from its anal attachments; and if it does not peel readily off the tail, dissect it off rather than run the risk of breaking it.*

When the skin is removed, it must be pinned out with the inner surface upwards on a board (teakwood is the best) with a pin at every 3 or 4 ventrals, taking care to stretch the skin as evenly as possible; the subcutaneous and fatty tissue must then be removed, if the snake be at all of large size. The best way to do this is to scrape from the cut edges of the ventral shield towards the median line. When this is done, the whole surface must be brushed over with a preservative solution made by dissolving about half an ounce of corrosive sublimate in a reputed pint bottle of spirit.† This will coagulate any remaining subcutaneous tissues, and will effectually preserve the skin against the attacks of rats or insects. Do not get any on your nails, as it dyes them a brown colour. Then complete the pinning out of the skin with a pin to every one or two ventrals, according to size, and let it dry in-doors until next day; it may then be taken off the board and transferred to the collection. Small thin skins may be gummed on to large sheets of paper, the others are best kept between two boards, as they otherwise curl up in the hot weather.

---

* The only snake whose body-skin comes off with difficulty is *Bungarus fasciatus*; the spinous processes are so long and so firmly attached to the vertebral row of scales, that each has to be separately dissected out, no slight matter when two hundred have to be so treated; even then, button-holes will occasionally be made. The *Dhāman* has a most intimate union betwixt his tail and its skin; it must be dissected off, do not attempt traction.

† Corrosive sublimate (bichloride of mercury) being often required for these purposes, I may mention that it is procurable in the drug bazaars under the name (Tamil) of *Shavirum*. In Hindustani, the name is stated to be *Raskapūr* (meaning mercurial camphor); but this name is frequently and more properly applied to a sulphate of mercury. This substance is insoluble in spirit, and water changes it into the insoluble yellow subsulphate (*turpethum minerale*); this *raskapur* must be sublimed with common salt to change it into bichloride of mercury. I have known many people disappointed at getting this substance when they wanted corrosive sublimate.

Chapter IV.—Antidotes to Snake Poison.

I would fain not speak on this subject, as I do not believe that there is any antidote known for the bite of a poisonous snake, yet I cannot well avoid doing so considering that I belong to the medical profession. If you are really bitten by a snake such as the cobra, the hamadryas, the chain-viper, or other kinds well known to possess a poison fatal to man—and the snake has really injected poison into your system, unless you have the means of applying at once very active measures, you had best hang up your harp on the willow tree, beg your friends not to torment you with antidotes and make your bow to this pleasant world as gracefully as you can.

If you are fond of brandy and ammonia, by all means take your usual drams for the satisfaction of your friends; it pleases them, and will not, under the circumstances, do you much harm; but if you are not addicted to those stimulants, do not inconvenience yourself by their ingurgitation. The Melbourne gentleman (I forget his name) who, about a year ago, got himself bitten by a viper for experimental purposes, appears to have fared very well until the faculty administered stimulants to him, contrary to the distinct caution of the snake-exhibitor, who guaranteed no harm if his orders were strictly followed. It certainly seemed very hard that this unfortunate man (the snake exhibitor) was afterwards prosecuted for manslaughter, because it was taken for granted that he was an impostor and that the experimenter would have died, if his advice had been followed. My view of the case is this. This man had probably been bitten with impunity the first time by one of the snakes he was in the habit of catching; either from its poison being weak, or from his having used caustics to the wound, the blood-poisoning was insufficient to kill him, but sufficient to establish an immunity, (I do not see why this should not occur in snake blood-poisoning as well as in that of contagious fevers); the man was, therefore, able to be bitten without harm, though he ascribed his immunity to the powers of his drug (a preparation of iodine or bromine, I believe). That he was not an impostor is evident from the fact that when pressed to experiment by taunts of imposture, he produced a viper from inside his waistcoat, and acceded to the experimenter's request. The gentleman was bitten, the antidote applied, and distinct directions were given him as to his regimen, and there was no evidence, beyond that of a professor speaking on a subject on which he evidently knew no more than the poor snake-catcher, to show that, if these directions had been followed, death would have ensued. It is perfectly possible that, in certain conditions, stimulants may destroy the patients natural chance of recovery in snake bite just as they do in cholera. A snake-bitten person may recover after the administration of spirits just as a cholera patient occasionally recovers under the same unfavourable circumstances; a long experience of cholera is beginning, however, to teach us better, (I hope so at least).

In cases of poisonous snake bite, we are, however, worse off than in cholera; the number of cases are very small, and are mostly spread about the country out of the reach of medical aid so that regular experimentation cannot be carried out. The average number of cases of death by snake bite are about 1,800 per annum in the whole of the Madras Presidency, and there is little doubt that a great many cases of suspicious death are reported as snake bite in order to avert inquiry. This number is very small, considering the way in which the natives of India go about barefooted, and I believe that no Englishman has, for many years, been bitten otherwise than from his own rashness.

In a large number of cases the bites take place at night, and the kind of snake cannot be recognized; there is then a chance that a *bungarus* or some other snake less deadly than the cobra or the chain-viper has inflicted the bite. At all events, directly it is ascertained that the snake is a poisonous one, either by view of the snake or by inspection of the bite, no time should be lost in adopting local treatment; a string should be tied pretty tightly round the limb, toe, or finger, the punctures should be enlarged and vigorously sucked;[*] after this some tincture of iodine, or solution of iodine in an aqueous solution of iodide of potassium should be rubbed into the wounds. In default of this drug, vinegar or common salt might perhaps be used with advantage.[†] *More than this I would not do.*

Several medical men, both in India and in Australia, have, of late, been experimenting with snake poison; but their results have hitherto been entirely negative. Attention has been especially directed to substances injected into the circulation at or near the place of the bite, but though various substances of alkaline, or antiseptic nature have been employed, the results have been unsatisfactory. If any one wishes to pursue these experiments, he should provide himself with a good hypodermic syringe; those ordinarily sold are all but useless; the best pattern would be a small India rubber sphere fitted with a steel or platinum nozzle made in exact imitation of a viper's tooth.

---

[*] I do not believe that there is the slightest danger in this

[†] About a week ago, a horsekeeper came to me at night, having been bitten about ten minutes before by some snake, kind unknown. The foot was already much swollen and painful, and two streamlets of dried blood showed the places of the punctures and that they were undoubtedly done by a pair of poison fangs. I sent him to the hospital (close by) and ordered the punctures to be slightly enlarged and tincture of iodine rubbed in, to my considerable astonishment, I found him quite well in the morning In this case, the snake not having been seen, the evidence is obviously defective

As for medicines given internally, I have but small faith in them. I have known a bad case of snake-bite cured by the administration of the contents of the cruet stand mixed up together, but the remedy was heroic. If the patient insisted on having medicine, I should give about 20 grains of the chloride of sodium dissolved in an ounce of water every half hour; it could do no harm, and might possibly be of benefit. I would certainly eschew spirits. *Eau de Luce,* the compound tincture of ammonia, has, of late years, revived considerably in favour,* probably in consequence of some experiments of Dr. Richardson's in support of his theory that the blood was kept liquid by ammonia. The experiments were at once seen to be fallacious by all scientific men, but the theory had, for many years, a strange fascination for the medical profession.

Now, all that I have said on this subject must certainly appear to be very unsatisfactory; I am sorry for it, but we are advancing very slowly indeed towards the solution of the problem—an antidote for poisonous snake-bite. I have seen enough of experiments with antidotes to know that they are of a very unsatisfactory nature and their evidence open to any amount of objection. Antidotes for snake-poison like those for cholera only succeed in the hand of their inventors.

---

* Mr. Buckland, late Assistant Surgeon of the 2nd Life Guards, well known as a genial and facile writer on popular natural history, states that he owes his life to this medicine, (Curiosities of Natural History). If I remember right, he supposes that he must have pricked his finger with a knife *which* was dissecting a rat *which* had been bitten by a Zoological Garden's cobra. He was, shortly after, suddenly taken ill in the street and had just time to stagger into a druggist's shop, murmuring "Eau de Luce"! Fortunately the druggist was a highly intelligent tradesman and with as much presence of mind as his customer, understood at once what had happened and administered the antidote.

PART III.—CLASSIFICATION.

CHAPTER I.—PRINCIPLES.

The following table of the families of snakes with their sub-divisions is here presented in order to give a general idea of the system of classification observed, before entering into the details of the descriptive catalogue.

ORDER. OPHIDIA.

FIRST SUB-ORDER. HARMLESS COLUBRINE SNAKES.

(Serpentes colubriformes non-venenati.)

Snakes without poison-fangs in front of the maxillæ.

Families.	*Genera.*
I. TYPHLOPIDÆ. *Blind Snakes.*	
Small and quite cylindrical, resembling at first sight earth-worms rather than snakes. Eyes rudimentary, no ventral shields, forepart of the head covered with shields of a peculiar type. Rudiments of hind limbs, hidden. Burrowing snakes, rarely appearing above ground.	*Typhlina* *Typhlops.* *Onychocephalus*
II. TORTRICIDÆ. *Short-tailed Earth Snakes.*	
Body cylindrical; tail very short, conical. Eye small. Head shielded, but only one pair of frontals; ventral shields beginning to appear. Palatine teeth; Median groove at the chin. Rudiments of hind limbs visible. Burrowing snakes, occasionally found above ground.	*Cylindrophis.*
III. UROPELTIDÆ. *Rough-tailed Earth Snakes.*	
Body cylindrical; head short, conical; tail very short, ending in a rough or scaly disk, generally obliquely truncated. Head shielded, but only one pair of frontals; ventral shields	*Rhinophis.* *Uropeltis* *Silybura* *Plectrurus.* *Melanophidium*

Genera.

apparent. No rudiments of hind limbs.[*] No palatine teeth. Burrowing snakes, living at some distance under ground.

IV. CALAMARIDÆ. *Grovelling Snakes.*

Calamaria.
Microcephalus.
Oxycalamus.
Geophis.
Aspidura.
Haplocercus & 3 or 4 new genera.

Body cylindrical; head small; tail short, tapering. Eye small, ventral and subcaudal shields well developed; head shielded, but with one or more shields absent (generally one or more anterior frontals, and the loreal). Palatine teeth. Small snakes, living on the surface, under trees, stones, &c.

V. OLIGODONTIDÆ. *Filleted Ground Snakes.*

Oligodon.
Simotes.

Body more colubriform; tail moderate, tapering. Ventral and subcaudal shields well developed. Head normally shielded, with peculiar markings. Teeth few in number, in one genus no palatines. The connecting link between the foregoing ground-snakes and the next family.

VI. COLUBRIDÆ.

This family comprises all those harmless snakes which do not present any striking character, are fair and moderate in their proportions, and have none of the qualities necessary for their admission into other families. Their head shields are normal, with the exception of one or two species on the debatable ground betwixt this family and the Calamaridæ; they have not the compressed and slender body of the tree-snakes, yet some of them climb, and have a green coloration; they have not the superior nostrils and aquatic build of the true fresh-water snakes, yet some of them are amphibious. They are divided into the following groups :—

---

[*] It may be taken, as a general rule, that when a character is not specified it has nothing noteworthy about it, or that the arrangement is normal. Thus the presence of palatine teeth being normal, I mention their absence, but not their presence except when it is necessary to note the point; and I only say 'no rudiments of hind limbs,' when the neighbouring family has those appendages.

Genera.

Group I.—CORONELLINA. *Ground Colubers.*

Of small size, with smooth scales; some genera approach the Calamaridæ in imperfect head shielding, whilst others have the slender body, and keeled ventrals which indicate fitness for climbing or swimming.

Ablabes.
Cyclophis
Odontomus.
Nymphophidium
Coronella.

Group II.—COLUBRINA. *Agile Colubers.*

Attain a large size. Their scales are keeled, they are active enough to climb and swim on occasions, and are swift in their movements along the ground.

Coluber
Elaphis.
Compsosoma.
Cynophis.
Ptyas.
Xenelaphis.
Zamenis.

Group III.—DRYADINA. *Bush Colubers.*

Their compressed body, numerous ventrals (200 or more), and general green coloration show that they are transitional to the families of true tree-snakes.

Zaocys.
Herpetoreas.

Group IV.—NATRICINA. *Amphibious Colubers.*

These snakes lead off to the river-snakes; their nostrils are often superior; their scales are always more or less keeled, the ventrals considerably less than 200; long teeth at the back of the maxilla.

Tropidonotus
Atretium.
Xenochrophis.
Prymniodon.

VII. HOMALOPSIDÆ. *River Snakes.*

Body cylindrical; tail moderate, compressed at the root. Ventrals rather narrow. Nostrils superior, provided with a fleshy valvule. Head shields often irregular, anterior frontals encroached on by the large nasals. The last

Fordonia.
Cantoria.
Cerberus.
Hypsirhina.
Ferania.
Homalopsis.
Hipistes.
Herpeton.

tooth is transitional between a tooth and a poison-fang. Rarely found far from the water.

Genera.

VIII. PSAMMOPHIDÆ. *Desert Snakes.*

A class of snakes resembling the tree-snakes in their form, but of strictly terrestial habits. Body slender, head very distinct from the neck, head shields normal.

Psammophis
Psammodynastes

IX. DENDROPHIDÆ. *Tree Snakes.*

Body slender, snout rather long but rounded fairly; eye moderate or large with round pupil Ventrals broad with two lateral keels.

Gonyosoma.
Phyllophis.
Dendrophis.
Chrysopelea

X. DRYOPHIDÆ. *Long-nosed Tree Snakes.*

Body excessively slender; head narrow with the rostral shield developed into a snout often of some length. Eye moderate with horizontal pupil.

Tropidococcyx
Tragops
Passerita.

XI. DIPSADIDÆ. *Broad-headed Tree Snakes.*

Body slender, much compressed. Head very distinct from the neck, short and broad. Eye moderate, with vertical pupil.

Dipsas.

XII. LYCODONTIDÆ. *Harmless-fanged Snakes.*

Head depressed; snout spatulate and flat. Eye small, generally with vertical pupil. A large fang in front of the maxilla and mandible, but not grooved or hollow. Ground snakes.

Lycodon
Tetragonosoma.
Leptorhytaon.
Ophites.
Cercaspis.

XIII. AMBLYCEPHALIDÆ. *Blunt-headed Snakes.*

Body compressed, slender; head short and thick. Often a complete orbital ring of shields. Cleft of the mouth small, lower jaw not expansible, no mental groove. A degraded type, connected with the python family.

Amblycephalus.
Pareas.

XIV. XENOPELTIDÆ. *Iridescent Earth Snakes.* *Genera.*

Body cylindrical; tail short, tapering; head flat, depressed, covered with large triangular shield-like scales. Burrowing snakes transitional between the small earth-snakes and the pythons

Xenopeltis

XV. PYTHONIDÆ. *Pythons.*

Body rounded or square, very thick; head depressed, abnormally shielded. Labial shields pitted. Ventrals very narrow, 240 or more Scales smooth, 65 or more Rudimentary hind limbs visible as a spur in a groove on each side of the vent.

Python

XVI. ERYCIDÆ. *Sand Snakes.*

A family allied to the preceding by their rudimentary hind limbs, narrow ventrals, numerous rows of scales. Crown of the head scaled.

Gongylophis.
Cursoria.
Eryx.

XVII. ACROCHORDIDÆ. *Wart Snakes.*

Head small; eye small; nostrils superior. Entirely covered with small tubercular or spiny scales, no ventrals or subcaudals. Transitional to the sea-snakes.

Acrochordus
Chersydrus.

SECOND SUB-ORDER. VENOMOUS COLUBRINE SNAKES.

(Serpentes colubriformes venenati.)

Snakes with a short, erect and more or less immovable perforated tooth in front of the maxilla, and a poisonous salivary secretion.

Families. *Genera.*

I. ELAPIDÆ. *Venomous Colubrine Land Snakes.*

Land-snakes with a short and nearly immovable poison-fang. Head normally shielded, but no loreal.

Naga.
Ophiophagus
Bungarus
Xenurelaps.
Megærophis.
Callophis.

II. HYDROPHIDÆ. *Sea Snakes.*	*Genera.*
A short and nearly immovable poison-fang. Tail compressed into a paddle. Head shields tolerably regular, nasals generally contiguous. Ventrals narrow or none. Scales tubercular and dull. Eye small; nostrils superior.	*Platurus.* *Aipysurus* *Disteira* *Acalyptus* *Hydrophis* *Enhydrina.* *Pelamis*

THIRD SUB-ORDER. VIPERINE SNAKES.

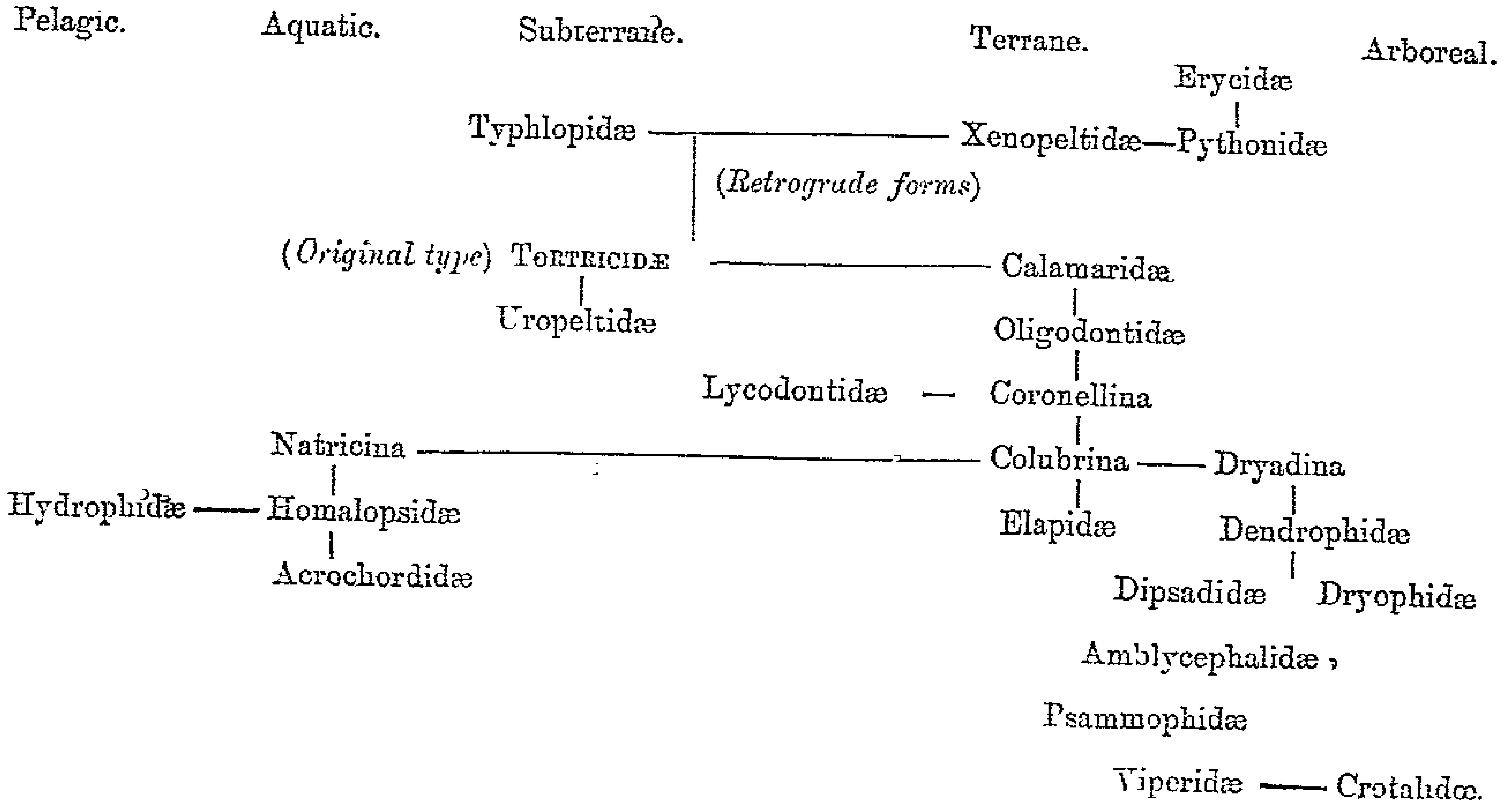
(Serpentes viperini)

Snakes with a long curved poison fang, more or less erectile.

Families.	*Genera.*
I. CROTALIDÆ. *Crotali* or *Pit-Vipers.* Broad thick head, very distinct from the neck, and generally scaly or imperfectly shielded A deep pit between the eye and the nostrils, leading to the *antrum maxillæ.*	*Trimesurus.* *Peltopelor.* *Calloselasma.* *Halys.* *Hypnale.*
II. VIPERIDÆ. *Vipers.* Broad thick head, scaly. No facial pit. Fang very long with a special erector muscle.	*Daboia.* *Echis*

The order in which I have arranged these families differs somewhat from that adopted by Gunther; the improvement, if any, is very slight, for it is difficult, especially when the Indian genera are alone considered, to arrange the families in groups which will show the affinities of the families which compose them. I have given first all those families which appear to have successively developed from the burrowing snakes, the lowest type, and then (at Lycodontidæ) I have returned to the lower types which either have retrograded or have developed on another principle. I imagine that the process by which development has taken place must have been somewhat on the system shown below, and I have no doubt that a consideration of general ophiology and not that of India alone, would fill up many hiatus at present evident.

Scheme of development from the original type.



CHAPTER II.—DIAGNOSIS OF AN UNKNOWN SNAKE.

The student of Ophiology should take some common and well-known snake and practice making the description of it with a view to familiarize himself with the various characters. He should practice drawing the head shields; to do this correctly, he must begin by drawing the vertical, and then gradually build up the other shields round it; to draw a snake full length in a natural attitude is a difficult task to any but a cunning limner; but an exact representation of the head and neck is possible to any one who will take a little trouble about it. Colouring the drawing accurately is far from an easy task, and requires some study of the natural process by which the colours have become blended.

When an unknown snake is required to be identified, the first step is to determine the family to which it belongs. Does it belong to the Colubridæ or to any one of the 20 other families? Some families have characteristics obvious at first sight. It is hardly possible to mistake the *Hydrophidæ*, the *Uropeltidæ*, the *Pythonidæ*, the *Typhlopidæ*, for any other families, though even in some of these the boundary line is not always very distinctly marked. In order to facilitate the comprehension of the preliminary allotment into families, I have drawn up the following synoptical table of them; if there be any uncertainty, their characters must be studied more minutely in the descriptive catalogue. In it, also must the divisions into groups, genera, and species be sought.

SYNOPTICAL TABLE OF FAMILIES.

A. NO POISON-FANGS.

1. Ventral shields absent or very narrow.

No ventrals; hinder parts thickest; eyes not visible.	Typhlopidæ.

Very small ventrals; head shielded, one pair frontals; tail very short.	Tortricidæ.
Similar, but tail short, truncated.	Uropeltidæ.
Narrow ventrals; large scales simulating head shields.	Xenopeltidæ.
Head shields redundant, labials pitted, scales above 60.	Pythonidæ.
Head scaly, scales 36 or more.	Erycidæ.
No ventrals; head scaly; scales tuberculated	Acrochordidæ.
2. Ventral shields fairly developed.	
a. Head shields deficient or redundant.	
One pair frontals deficient or single, nostrils lateral.	Calamaridæ.
Anterior frontals single, or nasals contiguous, or orbital ring complete; nostrils superior.	Homalopsidæ.
Head thick; orbital ring complete (generally), no mental groove.	Amblycephalidæ.
(Intercalated verticals; complete orbital ring —genus *Zamenis* Colubridæ.)	
b. Head shields normal.	
Few teeth (in one genus, no palatine); marks or serpiginous fillets on the head.	Oligodontidæ
Colours green or bright, ventral keels, pupil round, snout rounded.	Dendrophidæ.
Colours green or bright; excessively slender; pupil horizontal, snout very long.	Dryophidæ—
Very slender, head broad, pupil vertical.	Dipsadidæ.
Slender, head distinct, terrane (3 preceding are arboreal).	Psammophidæ

Head and snout depressed, flat; large harmless fangs.	Lycodontidæ.
Of moderate proportions; not referable to the preceding families.	Colubridæ.

B. POISON-FANGS PRESENT.

1. Short erect fangs; no loreal, head shielded.	Elapidæ.

(The Hydrophidæ belong to the class without ventrals.)

2. Long re-curved fangs.

Facial pit, head scaled or shielded.	Crotalidæ.
No facial pit, head scaled.	Viperidæ.

CHAPTER III.—METHOD OF DESCRIPTION.

It is necessary to lay down a system of description for snakes in general which will prevent useless details being given and direct the attention to the important points. Accurate description may be given very neatly in Latin; we must try and imitate in English the conciseness of the more classical description. The following scheme will give an idea of the way in which the description should be arranged.

Date Place

Length———; tail———. Sex ———.

Scales —— rows; smooth, keeled, or with apical grooves; imbricate? rounded, oval, linear, rhombic or rhomboidal; vertebrals enlarged? at what distance in tenths of length the number diminishes.

Ventrals, number; broad or narrow (in proportion to the circumference); keeled? turned up at the sides? Anal single or bifid. Subcaudals, number; single or double.

Head, distinct from neck? high, flat, broad, narrow; snout acute, obtuse; eye large, small, moderate; pupil round, erect, horizontal; iris, colour.

Head shields, normal? note peculiarities of crown-shields; loreal present, absent, single or multiple; nasal single or multiple, position of nostril. Anteoculars, number, does the upper one reach to the crown—to the vertical? (Subocular), Labials, number, how many enter the orbit, peculiarities; temporals, number, arrangement. Lower jaw—labials, number, first pair not contiguous? gular shields, number of pairs; gular scales, number.

Ground colour.

Longitudinal pattern. Stripes or streaks, number, breadth, position (vertebral, dorsal, lateral). Series of spots, of ring-spots, size, margins, disposition.

Transverse pattern. Cross-bars or cross-bands, series of rings (number), fasciolation?

Interstitial colouring.

Belly, throat, subcaudals—ground colour, marbling, stripes, &c.

Head, ground colour; stripes, cross-bands, fillets, ▷ or ◁ markings; postocular or subocular streaks.

Teeth, number (fixed), equal, increasing, decreasing; any longer teeth before or behind; separated by any interval; palatine teeth.

PART IV.—DESCRIPTIVE CATALOGUES.

In the following catalogue I have considerably abbreviated the full description, giving in most cases only the colour and the distinctive features. In the more common kinds of snakes, such as are ordinarily met with, I have somewhat enlarged this description in order to admit of their more ready recognition, whilst in those of which only one or two specimens exist in museums, I have given a description just sufficient to show the specific differences, but yet sufficient, I hope, to cause their recognition as rarities in case they should be perchance met with.

I have given the descriptions as succinctly as possible, but to avoid any mistake I may remind the reader that the lateral halves of a snake being symmetrical, I have, as a rule, described only one side. If I say that a snake has a vertebral, a dorsal and a lateral stripe, it must be understood that on *each* side of the single vertebral stripe there is a dorsal and a lateral stripe.

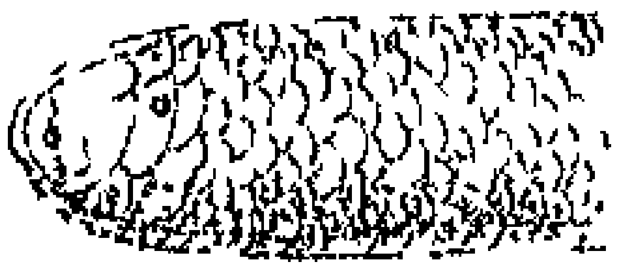
FIRST SUB-ORDER. HARMLESS COLUBRINE SNAKES.

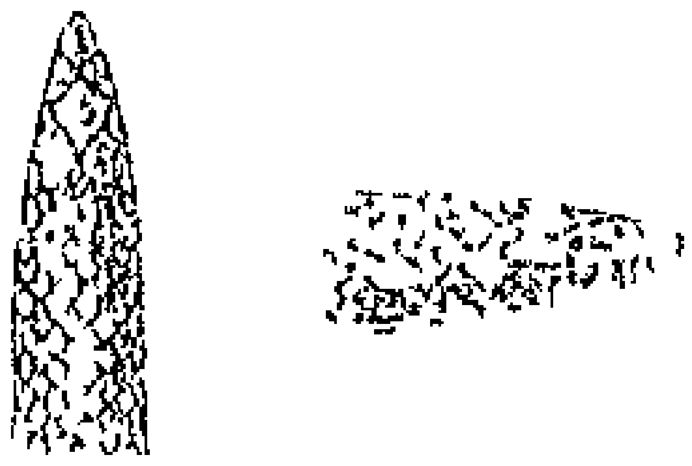
FAMILY I.—TYPHLOPIDÆ.

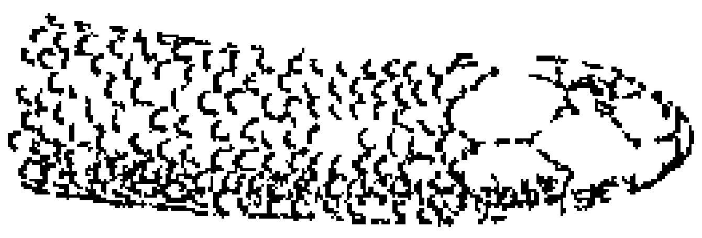
Of small size; body cylindrical, thicker behind; tail not longer than the breadth of the head, ending in a minute spine. Covered with equal scales, no ventrals, head covered with shields of a peculiar type. The rostral is prolonged backward; on either side of it, are four labials and four large shields, the nasal, the fronto-nasal, the anteocular, the ocular; behind it, are some small frontal and supraciliary shields. The eye is rudimentary, often quite invisible through the shields. Mouth very inferior, jaws hardly dilatable, no mental groove, a few maxillary teeth only.

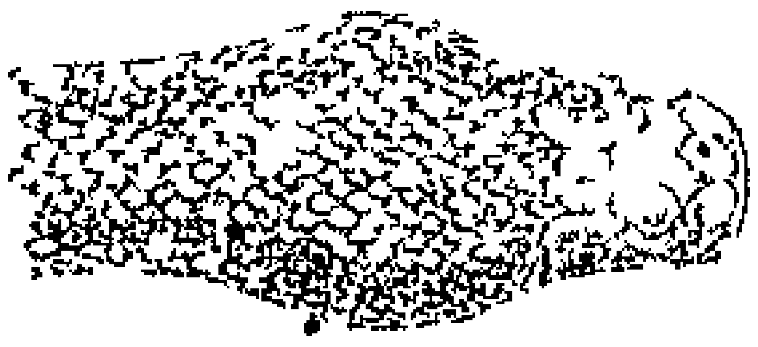
PLATE III

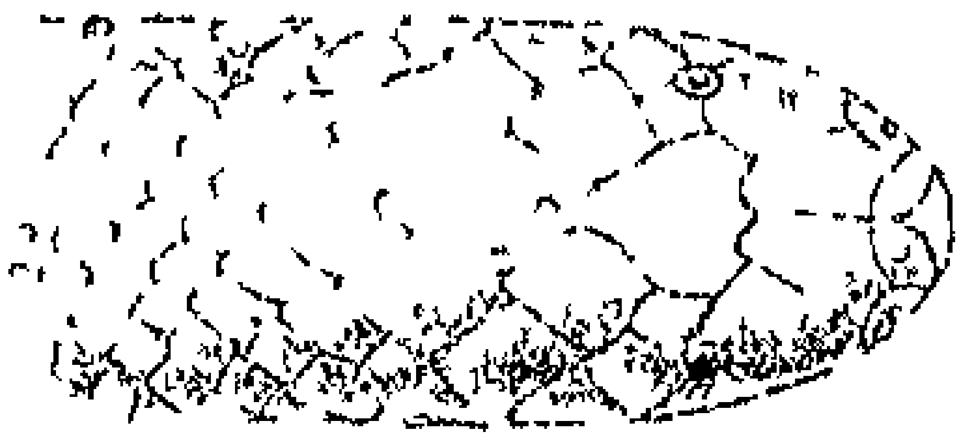
Examples of abnormal Head Shields

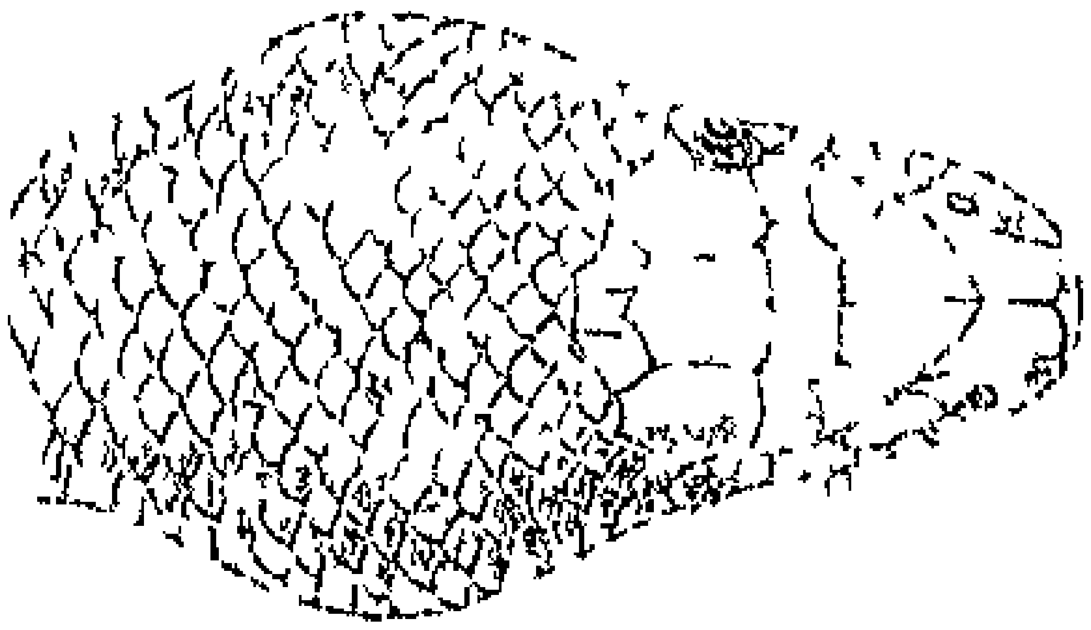

Typhlops braminus
/Typhlopidæ/

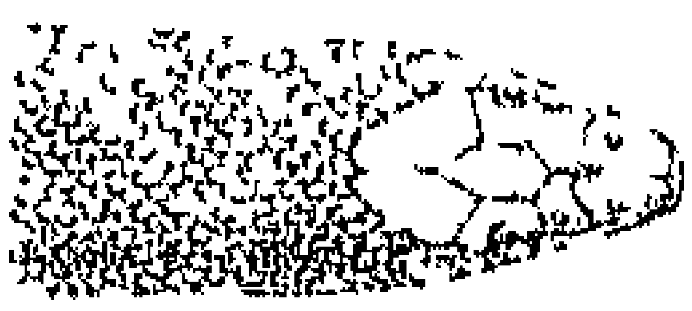

Silybura beddomei
/Uropeltidæ /

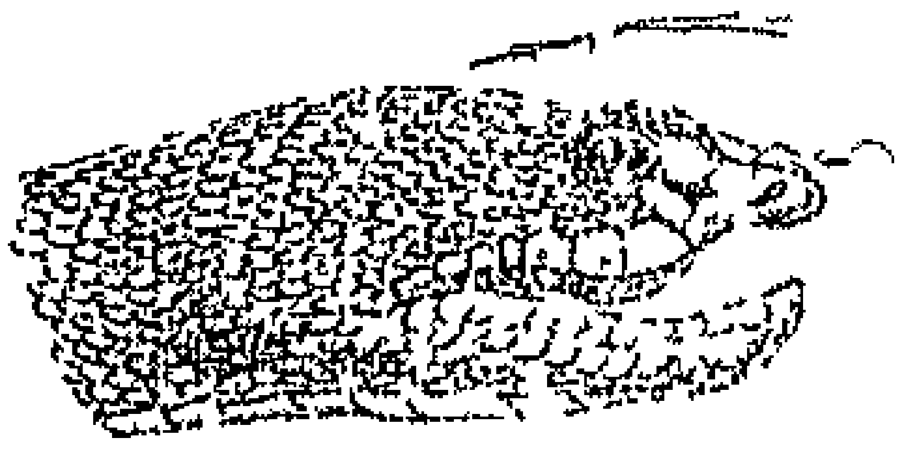

Calamaria siamensis
/Calamaridæ/


Cerberus rhynchops
/Homalopsidæ


Xenopeltis unicolor
/Xenopeltidæ/


Python reticulatus
/Pythonidæ/


Hydrophis cyanocinctus
/Hydrophidæ/


Trimesurus carinatus
/Crotalidæ /

TYPHLINA.

Rostral large, rounded in front; *no anteocular;* nostril inferior.

T. LINEATA. Scales 22. Transverse rows 405. Length 18 in., diameter $\frac{1}{45}$ (of length).

Reddish olive with numerous brown lines, snout and belly yellow.

Straits.*

TYPHLOPS.

Rostral large, rounded in front; nostril lateral.

T. NIGRO-ALBUS. Scales 26. Transverse rows 326—353. Length 14 in., diameter $\frac{1}{33}$.

Bluish black, belly yellowish.

Straits.

T. HORSFIELDII. Similar to the preceding, but nasal and fronto-nasal united above, and colour shading more gradually below. In Burma, I have found a snake with the character of this species, but colour pearl-grey above, white below.

T. BOTHRIORHYNCHUS. Scales 24 Diameter $\frac{1}{43}$. Four sutural grooves in the lower part of the snout.

Uniform brownish olive.

Penang.

T. STRIOLATUS. Scales 24.

Each scale with a yellow, posteriorly black-edged, cross-streak.

Bengal.

T. SIAMENSIS. Scales 22. Diameter $\frac{1}{47}$.

Greyish olive, yellowish below.

---

* When the Straits are mentioned as a habitat, they include Java, Sumatra, and the neighbourhood

T. GRAMINUS. Scales 20. Diameter $\frac{1}{50}$. Fronto-nasal not in contact with labials.

Brown, paler below

India.

T. TENUIS. Similar to the preceding. Diameter

Madras.

T. MIRUS. Scales 18. Diameter $\frac{1}{50}$. A subocular present.

Brown with yellow snout.

Ceylon.

ONYCHOCEPHALUS.

Nostril inferior. *Rostral with an anterior trenchant edge.*

O. ACUTUS. Scales 28-29. Longitudinal rows 500. Diameter $\frac{1}{45}$. Light bronze, each dorsal scale has a pale centre; yellowish below.

South of India.

FAMILY II.—TORTRICIDÆ.

Body cylindrical; depressed rounded head not distinct from neck; tail very short, conical, its end smooth. Rudiments of hind limbs visible. Scales smooth, polished; ventral row little larger than the others. Head shielded, but only one pair of frontals; six labials. Eye small. Cleft of the mouth moderate; palatine teeth; mental groove.

CYLINDROPHIS.

Nasals single, contiguous. Occipitals small. Frontal enters the orbit.

C. RUFUS. Width between the eyes greater than the length of snout. Scales 19—21. Ventrals 184—200+6—9.*

---

* The ventrals after the sign + are subcaudals.

Brown; belly has irregular white cross-bands extending up the sides.

Burma and Straits.

C. MACULATUS. Width between the eyes equal to the length of snout Scales 21. Ventrals 186—196 + 5 or 6.

Brown, with a network of black lines and cross-bands. White below.

Ceylon.

FAMILY III.—UROPELTIDÆ.

Body cylindrical with a short narrow head not distinct from the neck; tail very short, truncated, terminating in a rough naked disk or covered with keeled scales.

Scales round, polished; ventral row scarcely larger than the others.

One pair of frontals; four labials. Eye very small. Maxillary and mandibulary teeth, no palatine; generally no mental groove.

RHINOPHIS.

Tail cylindrical, covered with smooth scales and ending in a convex, scaleless, rough shield. Head conical; supraciliary and postocular confluent; *nasals separated by the rostral.* Scales 17—19. Ventrals 150—228; subcaudals 4—10. Length 10-14 inches.

Ceylon.

R. OXYRHYNCHUS. Rostral nearly half as long as head, keeled above. Nearly uniform brown.

R. PUNCTATUS. Similar to the preceding. Yellowish with black scale-dots.

R. PHILIPPINUS. (PLANICEPS.) Rostral shield not half as long as head, and without keel. Short. Uniform blackish olive.

R. TREVELYANUS. Similar to the preceding. Black, with white triangular lateral spots; belly white, black spotted.

R. SANGUINEUS. Similar to the preceding; rostral shorter. Black above; belly with lateral scarlet streak; caudal shield black with yellow streak and red margin. Found by Major Beddome in Wynâd.

R. BLYTHII. Caudal shield small, not half size of head, sometimes keeled. Common in Ceylon.

R. PULNEYENSIS. Snout obtuse; caudal shield very small. Brown with yellow lateral band and spots.

UROPELTIS.

Head conical; nasals contiguous; supraciliary and postocular confluent. *Tail cylindrical, obliquely truncated as if severed by a knife;* the disk flat, rough, scaleless.

U. GRANDIS. Scales 23—21. Ventrals 138—148. Subc. 7—8 bifid. Length 20 inches.

Brown with occasional white or yellow spots.

Ceylon.

SILYBURA.

Head conical; nasals contiguous; supraciliary and postocular confluent. *Tail subcylindrical, the scales on its upper side are shield-like and keeled,* forming a flattish disk ending in a horny bi-spinous scale. Length 6—14 inches. Hills of South of India.

S. MACROLEPIS. Scales 15. Ventrals 137. Black, with an irregular lateral yellowish stripe.

S. Beddomii. Scales 17. Ventrals 178. Rostral longer than the vertical, slightly keeled. Brown, lateral and ventral white dots; short yellow lateral stripe; vent and tip yellow.

S. ocellata. Scales 17. Ventrals 200. Rostral shorter than the vertical. Olive or brown, with numerous transverse series of four yellow, black-edged ocelli, (Major Beddome).

S. Elliotti. Scales 17. Ventrals 143—168. Rostral shorter than the vertical.

Brown, short yellow lateral streak, yellow caudal ring.

S. bicatenata. Scales 17. Ventrals 135. Rostral very short, vertical, rhombic. Black above and below, with yellow dorsal scale dots, and yellow lateral stripe.

S. Shortii. Scales 17. Ventrals 139, twice as broad as other scales. Fourth labial longer than high.

Black with irregular white scales; yellow lateral stripe and caudal ring. (Major Beddome).

S. brevis. Scales 17. Ventrals 122. Body short.

Brown, yellowish below, subcaudals black with white lateral line.

PLECTRURUS.

Head conical; nasals contiguous; *supraciliary and postocular distinct.* Posterior part of tail compressed, covered with keeled scales and *ending in a horny scale with two points one above the other.*

P. Perrotetii. Scales 15. Ventrals 161. Uniform brown.

Madras and Nilgiris.

P. Guntheri. Similar. Purple, yellow below; with lateral yellow triangular markings.

Nilgiris. (Major Beddome).

MELANOPHIDIUM.

Snout rather obtuse; nasals contiguous; supraciliary and postocular confluent. A mental groove. Tail slightly compressed, ending in a very small, smooth, horny point, slightly turned upwards.

M. WYNADENSE. Scales 15. Ventrals 180, thrice as broad as the other scales. Black, belly black and white behind.

FAMILY IV.—CALAMARIDÆ.

Body more or less cylindrical; head short, not distinct from the neck; tail short, tapering. Scales 13—17 rows. Ventral shields well developed, generally less than 200, and generally entire; subcaudals single or double. Eye small with round pupil. Normal number of head shields always reduced by absence or confluence of one or more, generally the anterior frontals or loreal. Mental groove; palatine teeth present. Length 12—24 inches.

CALAMARIA.

Nostril in a single nasal. Loreal none, merged in the frontal; 1 antocular, 1 postocular. *Only one pair of frontals,* 4 or 5 labials. Scales 13, smooth; subcaudals double.

C. SIAMENSIS. Ventrals 179—190, subc. 12—20. Labials 4. Brown, with 7—11 black lines; black collar with white or yellow edges; belly white, brown-spotted.

Burma, Siam.

C. QUADRIMACULATA. Ventrals 136—145, subc. 13. Labials 4. Similar to preceding; 2 pairs of white caudal spots.

Java, Burma.

C. ALBIVENTER. Ventrals 160—166, subc. 16. Labials 5. First pair lower labials not in contact as usual. Brown, with white (red?) stripes and belly.

Penang.

C. NIGRO-ALBA. Ventrals 147—166, subc. 25—35. Upper parts black, belly white.

Porfang.

C. LEUCOCEPHALA. Ventrals 136 + 37. Similar, but head white.

MACROCALAMUS.

Nostril between the nasal and the first labial. Loreal none, merged in the frontal; 1 antocular, 1 postocular; *only one pair of frontals; 8 labials.* Scales 13, smooth. Anal entire, subcaudals double.

M. LATERALIS. Ventrals 118 + 20.

Brown; lateral, dark, white-dotted line.

A solitary museum specimen.

OXYCALAMUS.

Head narrow, pointed. Two pairs of frontals; loreal merged in post-frontal; 1 antocular, 1 postocular; 5 labials. Scales 15, smooth; subcaudals double.

O. LONGICEPS. Ventrals 131 + 26. Uniform brownish black.

Penang. A solitary museum specimen.

GEOPHIS.

Two pairs of frontals, nostril between two nasals; 1 or 2 postoculars; *antocular and loreal confluent.* Scales 13—17 smooth, anal entire, subcaudals double.

G. MICROCEPHALUS. (*Platypteryx Perrotetii?*) Scales 13. Ventrals 148, subc. 26—30.

Brown; lateral black white-edged stripe. Yellow buccal streak; brown below.

Madras, Nilgiris.

ASPIDURA.

One anterior frontal; loreal merged in the frontal; 2 postocular, 1 antocular (sometimes merged in the frontal,) 5 or 6 labials, two small nasals. Scales 15—17, smooth, those near the vent sometimes keeled; anal and *subcaudals entire.* Length 14—16 inches. Ceylon.

A. BRACHYORRHOS. Scales 17. Ventrals 148—154, subc. 30. Antocular present.

Yellow olive with two dark lateral stripes; vertebral series of white dots. Belly white.

A. COPII. Scales 17. Ventrals 128 + 34. Antocular merged in post-frontal; 3 pairs of gular shields. Brown with dorsal row of black spots, belly white, marbled.

A solitary museum specimen.

A. TRACHYPROCTA. Scales 15. Ventrals 128—144, subc. 16—23. Antocular very small; post-frontal enters the orbit. Brown with a vertebral and two dorsal rows of dark spots.

HAPLOCERCUS.

One anterior frontal; loreal merged in the frontal; 2 postoculars, 1 antocular; 7 labials; two very small nasals. Scales 17, keeled; anal and subcaudals entire.

H. CEYLONENSIS. Ventrals 208 + 45. Brown with vertebral narrow black stripe, and dorsal row of black spots, white black-edged neck-streak; belly yellowish.

Ceylon.

New Calamaridæ.

Falconeria[*] gen. nov. (Theobald).

---

[*] The practice of naming new genera after private friends is very objectionable. Falconeria is doubtless a very handsome name that any snake might be proud of; but tributes of respect to my friends Smith, Brown, and Robinson would endow ophiology with as hideous a set of names as any in a seedsman's catalogue. Besides there are many Smiths, and we should be compelled to fall back on such names as *Johnsmithia bengalensis* or *Sydneysmithia elegans*. Happy the pioneer in zoology whose friends have handsome names.

Scales 17, keeled. One ant. frontal, post. frontal enters the orbit; labials 5. Anal and subcaudals double. Loreal present. *F. bengalensis.*

Blythia. gen. nov. (Theobald).

Scales 13, smooth. Two pairs of frontals. Loreal and anteocular none, both merged in post. frontal. Anal and subcaudals bifid. *B. reticulata.*

Grotea. gen. nov. (Theobald).

Proposed for *Ablabes bicolor.*

FAMILY V.—OLIGODONTIDÆ.

Body subcylindrical, with a short head not distinct from the neck, tail moderate or short. Scales smooth, rounded, 15—21. Ventrals of moderate breadth, rarely above 200, generally much fewer; subcaudals double. Eye moderate, pupil round. Head shields normal (one exception). Teeth few, increasing, no palatine teeth in Oligodon. Head nearly always with symmetrical ⊳ markings; belly often with square symmetrical dark spots on the ventrals.

OLIGODON.

Nostril between two partly confluent nasals. One anteocular, one or two postoculars. Rostral produced backwards. Scales 15—17. Length 10—20 inches. *No palatine teeth.*

O. SUBGRISEUS. Scales 15. Ventrals 180—202 subc. 48—54. Labials 7 (3 and 4).

Brown with numerous narrow cross lines, crossed by a vertebral and dorsal white stripe; belly white; head-markings.

South of India, Anamullies.

O. SPILONOTUS. Scales 15. Ventrals 155—162 subc. 50. Labials 7 (3 and 4).

ertebral series of about 17 brown 8-shaped spots, with alternate thin cross lines; belly white; head-markings.

South of India.

O. ELLIOTTI. Scales 15. Ventrals 156+30. Labials 7 (3 and 4).

Vertebral series of about 37 large rhombic black spots, giving off cross streaks; belly white; head-markings.

A solitary museum specimen. South of India.

O. SUBPUNCTATUS. 8 labials (4, 5 and 6).*

Grey with vertebral series of round black white-edged spots; belly white with lateral black dots; head-markings.

Western Coast.

O. SPINIPUNCTATUS. Scales 17. Ventrals 193 + 62. *Labials 9 (4, 5 and 6).*

Similar to the preceding, but no ventral dots.

A solitary museum specimen.

O. FASCIATUS. Scales 15. Ventrals 180 + 40. Labials 7 (3 and 4).

Brown; about 27 broad black-edged cross-bands; a narrow vertebral stripe; belly white with small brown spots; head-markings indistinct.

South of India.

O. SUBLINEATUS. Scales 15. Ventrals 150 + 32. Labials 7 (3 and 4).

Brown, with dorsal series of brown white-edged spots; belly with 3 punctulated brown streaks.

Common in Ceylon.

---

* (4, 5 and 6) means that the 4th, 5th, and 6th labials enter the orbit.

O. AFFINIS. Scales 17. Ventrals 134 + 25. Loreal none. Labials 7 (3 and 4). Brownish grey, with short thin black cross-bars, belly white with square black (ventral) spots; head-markings with longitudinal streak.

Anamullies (Major Beddome).

O. TEMPLETONII. Scales 15. Ventrals 135 + 31. Labials 7 (3 & 4) 5th and 7th contiguous below. Brown, with light vertebral band, and about 18 dark cross-bands, belly white, square spots.

Ceylon.

O. MODESTUS. Scales 15. Ventrals 158 + 41. Anal single. Labials 6 (3). Loreal none, one postocular. Brown, with posterior light vertebral stripe; light collar, belly white with square black spots; head-marking obscure.

Ceylon (?). Solitary museum specimen.

O. DORSALIS. Scales 15. Ventrals 173 + 60 Labials 7 (3 & 4). Brown, punctulated with black; yellow vertebral stripe bordered with black spots; black dorsal line; belly white, with square black spots.

O. BREVICAUDA. Scales 15. Ventrals 172 + 30. Only one pair of frontals; rostral reaching far backwards. Labials 7 (3 & 4). Loreal none. Greyish violet; posterior whitish vertebral stripe, bordered with black spots; black lateral stripe. Belly same colour, with square black spots; head-markings distinct.

Anamullies (Major Beddome). Solitary museum specimen.

SIMOTES.

Anterior frontals short, transverse; rostral produced backwards between them; nostril between two nasals. Scales smooth 17—21 rows. Ventrals often have a slight lateral keel. Head markings of the family always present.

Palatine teeth. Length 15 to 27 inches. Generally 7 labials (3 & 4). Found in India, but more common in Burma, Siam, &c.

S. VENUSTUS. Scales 17 Ventrals 142—145, subc. 31—35. Anal bifid. Brown, with 3 rows of round black yellow-edged spots; belly white with square black spots; head-markings.

Western Coast.

S. RUSSELLII. Scales 17. Ventrals 160—190, subc. 47—56. Anal bifid. Light brown, with 20 to 30 broad black (white-edged) cross-bands; belly white; head markings very distinct, a black fillet through the eyes, a ▷ rising from the *throat, point on the vertical, the first cross-band forming* another ▷ behind it.

India, Ceylon.

S. BINOTATUS. Scales 17. Ventrals 181+41. Anal bifid. Rhombic black-edged spots on each side of vertebral line, smaller spots in the intervals; belly white; three angular head markings.

Western Coast.

S. ALBIVENTER. Scales 17. Ventrals 179 + 45. Anal bifid. Loreal none. Brown above, white below, subocular spot.

Ceylon.

S. SIGNATUS. Scales 17. Ventrals 149—157, subc. 47—59. Anal entire. Brown, with about 15 white cross-bands, the middle of each wide and pointing forwards.

S. CINEREUS. Scales 17. Ventrals 165. Anal entire. Labials 8 (4 & 5). Grey above, white below.

Cambodia.

S. SWINHONIS. Scales 17. Ventrals 158—168, subc. —3539. Anal entire. Reddish olive with indistinct dark reticulated cross-bands, white below.

China.

S. TÆNIATUS. Scales 17. Ventrals 150—166, subc. 30—44. Anal entire. Brownish olive, brown vertebral stripe inclosing a light median line; black spot on root of tail, another on tip; belly white with square black spots.

Siam.

S. CRUENTATUS. *The Coral-tail Snake.* Scales 17. Ventrals 163 + 36. Anal entire or bifid. Olive brown; dark vertebral stripe, sometimes enclosing a lighter stripe; lateral thin stripe; belly greenish yellow with square blue-black spots; subcaudals coral-red with black spot at the root and near the tip. Punctulated head markings, often not unlike a mask. In the young, there are the superior tail-marks of the preceding species.

Common in Burma.

S. TRILINEATUS. Scales 17. Ventrals 145 + 54. Anal entire. Brown, with a vertebral yellow stripe and a dorsal white stripe.

S. PUNCTULATUS. Scales 19. Ventrals 180—202, subc. 52—62. Anal entire. Brown, with about 20 light, black-edged cross-bands or pairs of spots; belly with square spots.

Himalayas.

S. BICATENATUS. Scales 19. Ventrals 161—180, subc. 36-47. Anal entire, slight ventral keel. Labials 6, 7, or 8. Of stout habit. Light reddish brown, with three darker stripes; the vertebral stripe encloses a light median line and extends on the vertical, separating two oblique head markings that converge from the dorsal stripes. Fillet across the eyes. Belly white or fawn with alternate square spots.

Common in Burma.

S. ALBOCINCTUS. Scales 19. Ventrals 175—181, subc. 47—65. Anal entire. Brown, with about 18 white, dark-edged cross-bands, narrow black cross-bands alternating; belly white or spotted; usual head markings.

Assam.

S. FASCIOLATUS. Scales 21. Ventrals 163 + 42. Anal entire. Yellowish, with black irregular cross-bands; light dorsal stripe, median white line on tail; belly white, usual head markings.

Cochin-China.

S. COCHINCHINENSIS. Scales 21. Ventrals 216 + 47. Anal entire. Grey, with about 12 black cross-bands, belly white; head marking black.

S. TRINOTATUS. Scales 21. Ventrals 183—189, subc. 49—51. Anal entire. Brown, with three series of dark, black-edged spots; belly yellow with square black spots; head markings indistinct.

Straits.

S. AMABILIS and

S. THEOBALDI are also recorded.

Mr. Theobald has made species *S. obscurus* and *S. crassus* of two solitary museum specimens, but they appear to be aberrant varieties of *S. bicatenatus*. Indeed, nearly all the species of this genus may be referred to two types, *S. bicatenatus* and *S. russellii*.

FAMILY VI.—COLUBRIDÆ.

This family is a general refuge for snakes with none of the characters necessary for their allotment to the other families. Their head-shields are normal, they have not the exceptional dentition and head-markings of the Oligodontidæ, they have no trace of fangs, they have not the compressed and slender body of the tree-snakes, nor the hydrophidian build of the true fresh-water snakes. Nevertheless, several genera lead off to other families. Some of the group Coronellina (grovelling colubers) are hardly removed from the Calamaridæ, the group Dryadina (bush colubers) lead off to the tree-snakes, and the group Natricina (water colubers) are a transition towards the Homalopsidæ. The other group, Colubrina, although ground-snakes, are exceedingly agile, and able to swim and climb with facility they are the type of the sub-order of harmless snakes.

Group I.—CORONELLINA.

Colubrine snakes of small size with smooth scales; some genera approach the Calamaridæ in imperfection of the head-shields.

ABLABES.

Body rather slender; head moderate, more or less distinct from the neck; tail moderate, eye moderate, pupil round. Head-shields normal except in *A. fuscus* and *bicolor*. Nostril between 2 nasals; 1 loreal; 1 or 2 antoculars, 2 postoculars. Scales 13—17 smooth, ventrals 122 to 245, anal and subcaudals double. Teeth normal, numerous, small, equal. Length 12—22 inches.

A. BALIODIRUS. Scales 13. Ventrals 122—132 subc. 65—72, labials 7 (3 & 4). Brown, with anterior dorsal series of black, white ocellated spots; belly pearl colour.

Straits.

A. TENUICEPS. Scales 13. Ventrals 137+39. Labials 6 (3 and 4). Scales about the vent and root of the tail are keeled. Blackish ash, belly white.

Himalayas.

A. FUSCUS. Scales 13. Ventrals 154—161, subc. 34—42 Labials 6 (3 and 4). Scales about the vent and root of the tail are keeled in the male. Posterior frontals united into one shield, (whence this is sometimes made a genus of Calamaridæ, under the name of *Trachischium fuscum*). Black above, whitish below.

Himalayas.

A. RAPPII. Scales 15. Ventrals 191—198, subc. 60. Labials 6 (3 and 4). Black above, white below; when young, grey with black bars and collar.

Himalayas.

A. BICOLOR. Scales 17. Ventrals 210—221, subc. 75—80. Labials 6 (3). Frontals united into two transverse plates (whence Mr. Theobald makes this a genus of Calamaridæ and has named it, after a friend, *Grotea bicolor*). Brown above, white below.

Assam.

A. OLIVACEUS. Scales 17. Ventrals 224+75. Labials 5 3). Dark greenish olive, paler below; four dorsal series of small black dots.

Nilgiris. (Major Beddome).

A. SAGITTARIUS. Scales 17. Ventrals 216—245, subc. 57—70.. Labials 7 (3 and 4). Reddish or greyish olive; blackish dorsal line, beneath which the colour darkens; vertebral series of dots; head brown; dark collar edged with yellow; belly yellowish, with a blue lateral line and ventral dots.

Penang, Bengal.

A. HUMBERTI. Scales 17. Ventrals 175+55. Labials 10 (4, 5 and 6) 7th and 9th contiguous below. Reddish olive; punctulated dorsal line, beneath which the colour darkens; vertebral series of black yellow-edged dots; black, yellow-edged collar; belly white, dotted.

South of India, Ceylon.

A. COLLARIS. Scales 17. Ventrals 177 + 102. Tail nearly one-third. Labials 10 (4, 5 and 6). Greyish brown, with anterior vertebral series of black dots; broad black collar with posterior yellow edge, produced forwards to the eyes; belly white, dotted.

Himalayas.

A. MELANOCEPHALUS. Scales 17. Ventrals 152+65. Labials 10 (4, 5 and 6) 7th and 9th contiguous below. Light brown, with two anterior white stripes commencing from a black collar, and interrupted by square black spots; belly white, spotted; head brown, lips yellow. Tail one-third (?).

CYCLOPHIS.

Body slender, tail moderate or long, head rather distinct from the neck. Head-shields normal, but only one nasal, pierced by the nostril. Scales 15, smooth. Anal bifid. Eye moderate or large, pupil round.

C. MAJOR. Head narrow, not very distinct. Ventrals 175 + 78. Uniform green, paler below.

China.

C. FRENATUS. Head distinct from the slender neck, broad with short snout. Ventrals 165 + 95. Olive with 3 anterior dorsal black stripes, the lateral pair are zigzag; yellowish below.

Afghanistan.

C. CALAMARIA. Head scarcely distinct, with obtuse conical snout. Ventrals 129—132, subc. 64—83. Loreal none. Grey with small irregular black spots coalescing into posterior stripes; belly white. Of small size.

Ceylon and South of India.

C. NASALIS. Ventrals 149 + 77. Nasal large and long; no loreal; two anteoculars. Greyish olive, with two dorsal irregular black streaks; belly white.

C. MONTICOLA. Ventrals 125 + 44. Brown with yellow collar. A solitary museum specimen.

Mr. Theobald makes a genus *Chlorophis* for a Cyclophis with two nasals.

C. Oldhami Labials 8 increasing, (4 and 5). Uniform bronze-brown.

ODONTOMUS.

Body slender, strongly compressed; head moderate, distinct from the neck. Ventrals above 200, angularly bent at the sides. Scales 13—15 smooth. Head shields regular; nostrils in a half-divided nasal. Eye moderate, pupil round.

O. NYMPHA. Scales 13, apical groove. Ventrals 234—243, subc. 82—87. Labials 8 (3 and 4.) White, with about 38 brown cross-bands.

South of India.

O. SEMIFASCIATUS. Scales 13, apical groove. Ventrals 232+84. Labials 7 (3 and 4.) White with about 50 broad dark-brown cross-bands.

O. GRACILIS. Scales 15. Ventrals 234 + 81. Anal entire. Labials 8 (3 and 4.) About 38 broad black crossbands; intervals white, marbled with brown.

South of India.

NYMPHOPHIDIUM.

Only differing from the preceding genus by the three last teeth being strong and trenchant.

O. MACULATUM. Scales 15. Ventrals 244 + 167. Anal entire. Loreal long, enters the orbit. Light brown, with a dorsal series of large brown spots; lateral series of dots, belly white.

CORONELLA.

A genus of doubtful occurrence in India. *C. lævis* was discovered in England a few years ago.

C. ORIENTALIS. Scales 17. Ventrals 163 + 65. Last maxillary tooth strong. Greyish brown, with 2 dark dorsal stripes, confluent posteriorly; narrow white collar; belly white, black spotted.

Group II.—COLUBRINA.

Snakes of moderate or large size and active habits, with scales in 15 or more rows, and generally more or less keeled. Head shields generally regular.

COLUBER.

Body rounded, of moderate proportions; tail one-fifth or less. Head shields regular, crown shields large; 1 anteocular. Scales smooth or feebly keeled in 19 or more rows. Anal bifid. Teeth equal. Peculiar head-markings.

C. RUFODORSATUS. Scales 21. Ventrals 174—178, subc. 50—52. ant. frontals pointed. Brownish grey with 4 series of irregular brown spots confluent posteriorly into stripes. Head with 3 black ⊳ bands.

China.

C. MANDARINUS. Scales 23. Ventrals 222+62. Scarlet with a series of about 44 dorsal, black, yellow-centred, rhombic spots; head with serpiginous black fillets.

China.

C. PORPHYRACEUS. Scales 19. Ventrals 189—211, subc. 56—70. Olive, with about 22 dark cross-bands, and posterior dorsal stripe; head with 3 black streaks, one median, the others postocular.

Assam.

C. pictus. Is noted by Mr. Theobald as occurring in Burma. Scales 23. Vertical and supraciliaries large. Labials 9 (5 and 6) Reddish grey with four anterior dorsal series of rhomboidal black ocellated spots; posteriorly four dorsal dark bands with white intervals. Oval black postocular spot.

The snake obscurely described by Blyth as *Platyceps semifasciatus* is here placed by Mr. Theobald and more fully described :—

C. semifasciatus. Scales 19. Ventrals 187. Labials 9. (5 and 6.) Occipitals very large; vertical with very concave sides. Pale olive grey, with anterior dark cross-bands and alternate dark spots, fading posteriorly. ⊲ mark on occipitals; belly white.

Subathoo.

ELAPHIS.

Body elongate and compressed, head distinct from neck. Tail moderate. Scales 23—25 keeled. Ventrals 200 or more, plain or slightly keeled; anal bifid. Eye moderate, pupil round. Head shields regular; 2 nasals; 2 anteoculars. Maxillary teeth equal.

Central Asia and China.

E. DIONE. Brown or olive, speckled with red; dorsal series of black rings, vertebral and dorsal black stripes; head with brown oblique cross-bands.

E. SAUROMATES. Broad black cross-bands with yellow intervals. Head and belly often yellow with black markings.

E. TÆNIURUS. Olive with black interrupted dorsal stripe and caudal black stripe inferiorly margined with white.

COMPSOSOMA.

Body elongate, compressed, head narrow, snout long, tail moderate. Eye moderate, pupil round, scales 19—23 keeled. Ventrals above 200. Anal generally entire. Head shields normal; generally 1 antocular; 2 nasals. Teeth numerous, equal. Of large size.

C. RADIATUM. *The chestnut dhâman.* Scales 19, middle rows strongly keeled. Ventrals 222—218, subc. 67—95. Labials 9 (4, 5 and 6.)

Antocular and loreal have a rough porous appearance. Frontals square. Iris golden. Colour bright chestnut, darkening posteriorly; three anterior black dorsal stripes, the upper broad, the middle interrupted, the outer interstitial. From the eye radiate three black streaks, one down, one downwards and backwards, one horizontally along the occipitals joining a broad black nuchal band. This snake puffs out its throat vertically and rises like a cobra, showing the beautiful interstitial pattern of the neck, and looking aslant. Hence known by the Burmese as the side-looking snake. Grows to six feet.

Common in Burma.

C. MELANURUM. Scales 19. Labials 9 (4, 5 and 6). Brown anteriorly, black posteriorly; anterior yellow black-edged vertebral stripe; three inferior ocular streaks; belly yellow, black posteriorly.

Java and Archipelago.

C. RETICULARE. Scales 21 (or 19) rows. Anal entire. Labials 8 (4, 5, and 6) Brown, behind black; with whitish cross-bands, sometimes reticulated; belly yellow marbled with black. The head shields have a tendency to coalesce.

Assam.

C. HODGSONII. Scales 23. Anal bifid. Labials 8 (4, 5, and 6) Brownish olive; black interstitially.

Himalayas.

CYNOPHIS.

Body slender and compressed; head narrow; tail moderate; scales 25—27 with slight keels or apical grooves. Ventrals above 200; anal entire. Eye moderate, pupil round. Head shields regular, two nasals, one anteocular.

C. HELENA. Scales 27, slightly keeled. Reddish olive; with numerous reticulated black cross-bands, each enclosing 2 white ocelli on either side, fading posteriorly into a broad lateral brown stripe; neck with 2 short lateral black stripes, black line along occipital suture, black postocular streak.

Ceylon, South of India.

C. MALABARICUS. Scales 25, with 2 apical grooves. Brownish olive with about 22 black cross-bands, each enclosing 3 white ocelli on either side and, at the ventrals, giving off diagonal cross lines beneath; posterior and caudal brown lateral band; a subocular and a postocular black streak.

Malabar and the Anamallies.

PTYAS.

Body elongate, somewhat compressed; tail one-fifth to one-third; head distinct from neck. Eye moderate or large, well sheltered by supraciliaries. Head shields regular; two anteoculars, the upper reaching to the crown; two or three loreals, 2 nasals. Scales 15—17; smooth or slightly keeled. Anal bifid. Maxillary teeth about 12, increasing. Of large size.

P. MUCOSUS. *The (stout) dhâman.* Scales 17, the middle rows keeled towards the tail; ventrals 169—208, subc. 108—134. Head rather short and broad; 3 loreals; all shields, especially the 8 labials, with black margins. Brownish or yellowish olive, with interstitial skin-colouring of yellow and black; scales with black tips forming a reticulated pattern on the tail, belly greenish white. It grows to 7 feet and is very common in India, less so in Burma. It is fierce and intractable; natives of India believe that it breeds with the cobra. English people in India often call it the rat-snake, a name as inappropriate as its scientific name. It is not more mucous or salivary, and does not feed more on rats than the average of other snakes.

P. KORROS. *The slender dhâman.* Scales 15, smooth, with apical grooves; ventrals 176—179, subc. 138—147 (I have seen subcaudals 57 only). Slender neck, narrow head; eye large; loreals 2, rarely 3; colour uniform brown olive, no black margins to head shields, slightly to the caudal scales. Grows to 6—7 feet.

Common in Burma, where the people eat it.

XENELAPHIS.

Body elongate, not compressed; tail long; head distinct, rather short; eye moderate, pupil round. Head shields regular, 2 anteoculars. Scales 17, smooth, the vertebrals large, 6-sided. Anal bifid. Teeth numerous, sub-equal.

X. HEXAHONOTUS. Ventrals 191—197, subc. 148—179. Loreal long, wedged between the anteoculars. Labials 8 (4). Brown with anterior faint black cross-bands; belly yellowish.

Burma, Straits.

ZAMENIS.

Body and tail elongate; head distinct, flat; eye moderate, pupil round. Head shields have a tendency to divide;

2 anteoculars, 2 postoculars, suboculars often present. Scales smooth or slightly keeled. Ventrals 200 or more, anal generally bifid. Teeth numerous, the last generally largest, and separated by an interval.

Z. DIADEMA. Scales 29, keeled. Ventrals 237+110, anal entire. 4 small shields transversely intercalated between the vertical and the frontals; 3 or 4 loreals; labials 14; orbital ring completed by 4 or 5 suboculars. Yellowish olive, with vertebral line of round brown spots, and a lateral brown stripe. Brown fillets, and head-spots.

Sindh.

Z. VENTRIMACULATUS. Scales 19, smooth. Ventrals 205—220 subc. 90—102, anal bifid. Labials 9 (5 and 6). Occipitals truncated with small semi-circular post occipitals. Yellowish olive, with black cross-bars, and black head-markings; belly yellowish, laterally dotted.

South-Western Asia.

Z. GRACILIS. Scales 21, smooth. Ventrals 210+120, anal bifid. Labials 9 (5 and 6). Yellowish olive, with vertebral row of large round black spots, becoming short cross-bars posteriorly; black fillets; belly yellow, laterally dotted.

Deccan, Sindh.

Z. FASCIOLATUS. Scales 21—23, apical grooves. Ventrals 201—229, subc. 73—87, anal bifid. Labials 8 (4 and 5). Yellowish olive with anterior, narrow, white black and brown cross-bands; belly yellowish.

South of India, Straits.

Group III.—DRYADINA.

The compressed body of these snakes, their agility, their numerous ventral shields, and green colour, show that they lead off to the true tree-snakes, whilst their head shields are those of the *Colubridae*.

ZAOCYS.

Body elongate and compressed, tail moderate; head very distinct, high. Eye large, pupil round. *Scales* 14-16, the median series sometimes keeled. Ventrals about 200, anal bifid. Head shields regular; supraciliaries large, convex; 2 anteoculars, the upper large and high. Loreal often multiple.

Z. CARINATUS. Scales 16, the 2 median rows keeled; ventrals 209+110. Labials 9 (5 and 6). Loreals 3. Anteriorly brownish olive, with reticulated white cross-bands; posteriorly black, with 2 lateral series of white spots. Grows to 10 feet. Borneo.

Z. FUSCUS. This snake, hitherto assigned to Borneo, is, according to the opinion of Dr. Günther, the same as a snake found by Mr. Vinton in the jungle near Rangoon, and to which I intended to have given the name of *Z. fasciolatus.* The following is its description:—

Scales 16, the 2 median rows faintly keeled. Ventrals 210+123. Head oblong, high; gape wide; eye very large and prominent; pupil round, iris dark green. Loreals 3. Labials 9 (5 and 6), the sixth extending high behind the orbit. Dark green, with narrow fasciolated cross-bands of lighter and darker colour, and yellow vertebral spot on each; posteriorly the cross-bands merge into a general greenish black with 2 lateral rows of yellow spots; under-parts nearly black; head dark green, with an appearance of bloom, throat white, yellow orbital circle.

Z. DHUMNADES. Scales 14 or 16, the 2 median rows keeled. Ventrals 189—199, subc. 92—98. Loreal single. Greenish anteriorly, with a yellow, black-edged vertebral stripe; posteriorly black; indistinct black lateral stripe.

China.

Z. NIGROMARGINATUS. Scales 16, elongate and pointed, the 4 median rows keeled, others with apical grooves. Ventrals 193 + 126. Green above, paler below, with 2 posterior broad black stripes.

Himalayas.

HERPETOREAS.

Body slender compressed, head elongate, rounded in front. Eye moderate, pupil round. Scales elongate, 17 or 19; ventrals bent up at the sides, above 200; anal bifid. One antocular, head shields regular. Last tooth the longest.

H. SIEBOLDII. Scales 19, slightly keeled. Ventrals 216 + 90. Loreal single. Labials 8 (3, 4 and 5). Greenish brown, belly yellowish.

Himalayas.

H. PRASINUS. *Nicholson. sp. nov.* Scales 17, smooth, imbricate. Ventrals 200—205, subc. 112—177, bent up at the sides. Occipitals truncated, vertical broad in front, ant. frontals small, loreals 3, antoculars 2, lower very small, upper reaches to the crown, labials 8 (4 and 5). Eye large, pupil round. Green, paler below; numerous narrow cross-bands of darker tint with light anterior edge; posteriorly this fasciolated pattern merges into numerous black X bands on a yellow ground-colour; dark posterior margin on the side of each alternate ventral. I have three specimens of this, all about the same size; the largest is 18½ inches long, of which the tail is 4½ inches. It is perhaps the ill-described snake called *Coluber prasinus* by Blyth, though Mr. Theobald mentions *Herpetodryas prasinus, Blyth,* as a synonym, of *Gonyosoma oxycephalum.* The head is not unlike that of *Zaocys.*

Rangoon.

Group IV.—NATRICINA.

These snakes lead off to the Homalopsidæ; they are ground-snakes, but many of them frequent the water, an have the nostrils rather superior. Scales always more or less keeled; ventrals considerably less than 200, anal bifid.

TROPIDONOTUS.

Body rather stout, head distinct from the neck, gape wide. Eye moderate, pupil round. Scales generally 17—19, keeled, especially towards the tail. Teeth numerous increasing.

T. QUINCUNCIATUS. *The Checkered Snake.* Scales 19, keeled. Ventrals generally 137+85 or 145+77, the total not being far from 222. Tail often much shortened in females, I have seen it with only 18 subcaudals. Loreal rhombic; 1 antocular, 3 postocular, labials 9 (4 & 5); anterior frontals form a triangle. Crown narrow.

Variety a. Olive brown with black checkers formed by 6 alternating rows of square black spots; belly cream coloured with lateral black ventral margins; 2 black streaks go backward from the orbit.

Variety b. The outer row of checkers alone distinct; they are high, intervals red; ventrals tinged with red, black nuchal streak; 2 black post-orbital streaks.

Very common throughout the East Indies; variety *b* in its most marked form is peculiar to Burma. Grows up to 40 inches.

T. ANNULARIS. Scales 19. Ventrals 158 + 54. Upper parts plumbeous; lower parts red with about 40 black cross-bars, extending up the sides.

China.

T. TRIANGULIGERUS. Scales 19. Ventrals 140—148, subc. 70—90. Labials 9(4, 5, & 6). Dark brown, reddish anteriorly, with lateral triangular black spots, apex resting on the ventrals.

Straits.

[The remaining snakes of this genus have the last tooth enlarged and enveloped in a gingival fold]

T. MACROPHTHALMUS. Scales 19, numerous on the neck, which is dilatable, like that of the cobra. Ventrals 162 + 78. Eye large. Dark brown dark vertebral spots and an indistinct > collar; belly with anterior square spots.

Himalayas.

T. DORSALIS. Scales 17. Ventrals 143 + 52. Eye large. Resembles the preceding species.

China.

T. MACROPS. Scales 17. Ventrals 164 + 13. Eye very large. Dull red, with a vertebral series of yellow spots and black lateral spots; variable.

Darjiling.

[The following species have the last tooth enlarged and separated by a distinct interval.]

T. PLATYCEPS. Scales 19, feebly keeled. Ventrals 173—186, subc. 90—96. Brown with a pale dorsal stripe; a red and a black lateral ventral stripe; black or yellow postocular streak; variable.

Himalayas.

T. SUBMINIATUS. Scales 19, keeled. Ventrals 142—168, subc. 61—88. Light brown, with an interstitial colouring of bright red on the neck, of black and yellow on the rest of the body; yellow < collar; head green, cheeks pink, green and black double post-orbital streak, throat yellow. When young it resembles *T. stolatus* with yellow collar.

Burma, Assam, Straits.

T. HIMALAYANUS. Scales 19, strongly keeled. Ventrals 171 + 85. Brownish olive, with dorsal series of transverse yellow spots; yellow collar and throat.

T. ANGUSTICEPS. Scales 17. Ventrals 167—172, subc.

57—67. 2—4 anteoculars, 4—5 postoculars. Head narrow. Dark, spotted uniformly with black.

Assam, Burma.

T. STOLATUS. *The Chameleon Snake.* Scales 19, strongly keeled. Ventrals 125—161, subc. 50—79. Labials 8 (3, 4, and 5.) Brown with numerous cross-bands of black, the intervals having an interstitial colouring of red, or of pale blue, or of both, the red prevailing in the first four or five intervals. These bars are crossed by a dorsal light brown stripe, the point of intersection of the black bars being still lighter. Belly white with lateral black dots on alternate ventrals; throat yellow; black marks on the labials.

This snake only shows those beautiful colours when excited; at other times it is brown with a light dorsal stripe. Grows to 2½ feet. The gentlest of snakes. Very common in India and Burma.

T. MONTICOLA. Scales 19. Ventrals 142 + 82. Green, with about 28 black cross-bands, crossed by a green dorsal stripe; white spots at the intersection; pair of white dots between the eyes.

T. JUNCEUS. Scales 19. Ventrals 154 + 86. Grayish olive, with a dorsal row of round white spots; belly white with lateral dots. Throat yellow; yellow collar.

Straits.

T. CEYLONENSIS. Scales 19, strongly keeled. Ventrals 137 + 60. Brownish olive, with about 20 unsymmetrical cross-bands, each enclosing a lateral yellow ocellus, black post-orbital streak.

T. BEDDOMII. Scales 19, strong keeled. Ventrals 146 + 70. Labials 9 (4, 5, and 6). Brown, with dorsal transverse orange bars; nuchal yellow cross-bar, and yellow black-edged post-orbital streak.

Nilgiris.

T. NIGROCINCTUS. Scales 17. Ventrals 160 + 81. Olive grey, passing into green near the head, with about 50 narrow black-cross bands and nuchal black band preceded by a pale or red collar; belly grey, darkening posteriorly.

Burma.

T. FLAVIPUNCTATUS. Scales 17. Ventrals 128 + 78. Uniform dusky yellow, spotted with yellow above and with black below; black nuchal band, and two black post-orbital streaks.

China.

T. ZEBRINUS. Scales 15. Ventrals 137+96. Plumbeous, spotted and cross-banded with black; Labials with triangular black spot at their junction above; nuchal band.

Tenasserim.

T. TIGRINUS. Scales 19. Ventrals 152—168, subc. 62—80. Olive with a vertebral and a dorsal row of square black spots, reddish lateral intervals anteriorly; belly black spotted , black post-orbital markings.

China.

T. LEUCOMELAS. Scales 19, strongly keeled. Ventrals 129+61. Black above, white below, with about 23 narrow white rings rising across the back; head greenish olive with black collar, yellow-edged posteriorly.

Straits.

T. PLUMBICOLOR. (*T. viridis* would be preferable). Scales 25 (23—27) strongly keeled. Ventrals 160+42. When young it is bright green with a broad yellow black-margined collar, and narrow black cross-bars, with a black lateral spot in the intervals. These beautiful colours fade in the adult. It is very gentle.

South of India, Nagpore.

T. PUNCTULATUS. Scales 17, obtusely keeled. Ventrals 140—156, subc. 68—83. Tail compressed at the root. Upper parts either jet black, or brown irregularly spotted with white; belly and outer 2 rows of scales white, with a zigzag black or brown line along the junction of the ventrals and outer scales; labials white; subcaudals have a black posterior margin. Grows to 30 inches.

Burma.

T. MORTONI. Scales 19, strongly keeled. Dark brown, with dark vertebral stripe and interrupted cross-bars of yellow or white spots. A solitary museum specimen; it has no connection with the person after whom it was named by Mr. Theobald.

T NATRIX. is the common harmless snake of England.

ATRETIUM.

A Tropidonotus distinguished by having the anterior frontals united into one broad triangular shield (in contact with the rostral). Other head-shields regular. Scales 19, short, rhombic, keeled. Ventrals broad, anal bifid. Teeth numerous increasing.

A. SCHISTOSUM. Ventrals 147 + 80. Uniform blackish olive; lips, outer two rows of scales and belly, yellowish; purple or blackish long post-orbital stripe. Expands the neck somewhat.

Ceylon, South of India, Straits.

XENOCHROPHIS.

A Tropidonotus with the middle teeth longest, and with the nostril in the upper part of a single shield. Scales 19 keeled. Anal bifid.

X. CERASOGASTER. Ventrals 141—149, subc. 60—69. Shields of the crown elongate. Labials 9 (4). Brown with lighter dorsal stripe or dorsal series of dark spots; belly purple, marbled; bright yellow lateral line beginning at the snout.

Bengal, Assam, Straits.

PRYMNOMIODON.

A Tropidonotus with minute teeth much enlarged anteriorly. Head-shields normal. Scales 19, keeled.

P. CHALCEUS. Ventrals 152. Green. A solitary museum specimen.

Siam.

CADMUS.

A genus made by Mr. Theobald for a Tropidonotus of stout form with 27 rows of smooth scales. Rostral large and penetrating between the small anterior frontals. Labials 7 (4).

C. CUNEIFORMIS. Olive brown with two dorsal rows of black spots. A solitary museum specimen.

TYTLERIA.

Under this objectionable generic name Mr. Theobald places a snake of Homalopsic aspect.

T. HYPSIRHINOIDES. Scales 17 smooth. Nasal semi-divided; head-shields normal. Labials 2 (3, 4, and 5). Reddish brown above, belly yellowish white.

Andamans.

FAMILY VII.—HOMALOPSIDÆ.

Body cylindrical; head thick, not very distinct from the neck; tail moderate, compressed at the root. Scales often strongly keeled; ventrals rather narrow, anal bifid. Eye small, prominent. Nostril superior, small, valvulated; nasals large, encroaching on the size of the anterior frontals (which are often confluent). Head-shields generally tend to deviate from the normal arrangement. The last tooth is transitional between an ordinary tooth and a fang, but there is no evidence that the saliva is poisonous. They live in rivers and estuaries, rarely coming to land.

FORDONIA.

Head shielded, nostril superior in a single nasal. Anterior frontal single, small, in contact with rostral. *Five labials. Scales smooth,* 25—29.

F. UNICOLOR. Scales 25—27. Ventrals 140—156, subc. 26—37. Labials 5 (3). Brown; belly and outer scales whitish.

Straits, Burma.

F. BICOLOR. *Theobald.* Labials 5 (5). Yellowish grey, dark spotted; sides and belly white.

Rangoon.

CANTORIA.

Head shielded; anterior frontal single, in contact with rostral. Eye very small. *Orbital circle complete. Five labials. Scales* 19, *smooth.*

G. ELONGATA Ventrals 278 + 84. Reddish violet, with cross-bands of white dots; whitish below.

Straits.

CERBERUS.

Occiput scaly. Anterior frontals two, small; nasals two, large, contiguous; *orbital circle complete;* posterior labials divided transversely. Cleft of the mouth turned up behind. Scales strongly keeled, 21—25.

C. RHYNCHOPS. Scales 23—25. Ventrals 132—148, subc. 54—62. Vertical broken up; labials 9—10. Dark ash, with darker cross-bands posteriorly; under-parts whitish with marbled or cross-banded ash.

Common in East Indian estuaries. It often goes some distance from the water; I have a specimen which was brought half-alive to me, having been just caught in a compound nearly two miles from the Rangoon river.

HYPSIRHINA.

Head shielded; *a single anterior frontal,* nasals half divided, large, *contiguous.* Seven or eight labials. Scales smooth, 19—23.

H. PLUMBEA. Short and thick. Scales 19. Ventrals 120—131, subc. 29—44. Greyish olive, often with vertebral row of black spots; outer scales and belly yellowish, with black median subcaudal line.

Straits, China.

H. ENHYDRIS. Of very variable form, the male said to be slender, the female stout with ogival snout. My specimen has a sharp triangular head, slender and very elongate neck; posterior part very stout, tail very thin. Scales 21. Ventrals 159—166, subc. 54—69. Colour variable, that of my specimen is as follows:—Plumbeous, with posterior dorsal light line; lower parts and outer scales whitish, with salmon-coloured stripe along the second row of scales, dark stripe along median and lateral line of ventrals.

Rivers and irrigated fields in Burma and Siam.

H. JAGORII Scales 21. Ventrals 128 + 66. Brownish grey above, belly and four outer rows of scales blackish with a yellow lateral stripe and white median ventral stripe.

Siam. A solitary specimen.

H. BENNETTII. Scales 21. Ventrals 160 + 50. Anterior frontal small, does not touch the loreal. Brownish grey with transverse series of black spots; belly and three outer scales white; each ventral with median and lateral black spots.

China.

H. CHINENSIS.—Scales 23. Ventrals 150 + 45. Ant. frontal as large as a posterior frontal. Blackish ash with small black spots; belly and outer scales whitish, with black lateral band.

FERANIA.

Head short, body stout, head shielded. Nasals large, single, contiguous. *Two small anterior frontals. Scales smooth*, 27.

F. SIEBOLDII.—Ventrals 147—156, subc. 48—55. White with about 32 (vertebral) large, brown, black edged spots; small dorsal triangular spots in the intervals. Head brown with two diverging white lines.

Bengal, Straits.

HOMALOPSIS.

Head flat, triangular; body stout. Head shielded; anterior frontal single; nasals single, contiguous. *Orbital circle complete.* Posterior labials transversely divided. Cleft of mouth turned upwards behind. *Scales* 37—47, *keeled.*

H. BUCCATA.—Ventrals 160—171, subc. 70—84. Brown with about 30 narrow white crossbands. Belly and outer scales white; head markings.

Burma, Straits.

HIPISTES.

Head short; neck slender; tail stout, tapering. Head shielded; anterior frontal single, in contact with the rostral; nasals semi-divided. Scales smooth, 39; ventrals narrow, *with sharp lateral keel.*

H. HYDRINUS.—Ventrals 153—161, subc. 34. Occipitals multiple. Greenish yellow, with about 48 black crossbars.

Straits. Semi-pelagic.

GERARDA.

G. BICOLOR.—A snake caught at Rangoon is believed by Mr. Theobald to belong to this reputed West Indian genus.

My own specimen I at first thought to be a new Calamaria, though of amphibious appearance, as it was found in a dusty street of Rangoon.

Ventrals 156 + 18. Scales 17. Anterior frontal single, elongate, convex-ended, concavo-sided. Nostrils superior, in a single shield slightly split. Shining lead colour above, white below.

HERPETON.

Snout ends in two flexible cylindrical tentacles. Head shielded; two small anterior frontals; nasals single, contiguous. Orbital ring complete. Scales 37, keeled. Ventrals narrow with lateral keel.

H. TENTACULATUM.—Ventrals 133—136. Brown with 3 dorsal stripes; the uppermost connected with its fellow by cross-bars; belly yellowish with dark lateral stripes.

Siam.

FAMILY VIII.—PSAMMOPHIDÆ.

Body and tail generally elongate head very distinct with the loreal region very concave. Eye moderate, pupil round or vertical. Head shields normal; loreal present; posterior frontals rounded or angulated behind; superciliaries prominent. Anterior teeth longest, the last grooved.

Ground snakes approaching the Dryophidæ in form.

PSAMMOPHIS.

Body and tail elongate; long and rather pointed snout. Vertical long and narrow; loreal elongate. Pupil round. Scales smooth, 15—19. Anal bifid.

P. CONDANARUS.—Scales 17, lanceolate, with minute apical groove. Ventrals 176—182, subc. 80—90. Nasals generally double, sometimes single. Buff or light brown, with a dorsal and a lateral dark stripe ; belly yellowish with lateral black stripe, sometimes a supra and an infra orbital yellow streak from nose to neck.

India, Burma ; rare.

PSAMMODYNASTES.

Body and tail rather stout ; snout short, vertical long, anterior frontals very small, nasal single, pierced by the nostril. Pupil erect. Scales 17, short, rhombic, smooth. Anal entire.

P. PULVERULENTUS.—Ventrals 146—167, subc. 50—59.

Head long, crown flat, snout obtuse. The second or third tooth long and enveloped in a gingival fold so as to simulate a poison-fang. Labials 8(3,4 & 5), the first 3 high. General appearance and colour not unlike a short, narrow-headed *Dipsas*. Light brown, motted ; when young a black vertebral stripe with an edging of black and white spots this disappears with age ; belly and sides yellow with a median and two lateral rows of brown mottling or lines ; throat white, mottled ; ⋈ mark on head.

I caught one specimen while it was swimming across the Rangoon lake. Adult length 1 foot.

Assam, Burma, Straits.

FAMILY IX.—DENDROPHIDÆ.

Body and tail either much compressed or very slender ; head rather long, flat, and distinct from the slender neck ; snout moderate or long, rounded. Eye moderate or large, pupil round. Head shields normal ; scales much imbricate ; ventrals with two keels ; anal bifid.

GONYOSOMA.

Body long, compressed, head moderate. Loreal sometimes absent, anteocular one. Scales generally smooth. Ventrals above 200.

G. OXYCEPHALUM.—Scales 25, elongate, with a pair of apical grooves. Ventrals 236—263, subc. 138—149. Labials about 11 (2). Green, paler below; dark labial line; tail brown with yellow anterior ring. Length 5—7 feet.

Tenasserim and the Straits.

G. GRAMINEUM.—Scales 19, with apical grooves. Ventrals 203 + 100. Labials 9 (4,5 and 6). Green, paler below; tail reddish.

Khasya hills. A solitary specimen.

G. FRÆNATUM.—Scales 19, the dorsals faintly keeled. Ventrals 203 + 120. No loreal. Green, paler below, black labial stripe.

Khasya hills. A solitary specimen.

PHYLLOPHIS.

Body and tail elongate, much compressed. Head shields normal; two anteoculars; *nasal single*, nostril in the centre Scales 23, keeled. Ventrals above 200.

P. CARINATUS.—Ventrals 223 + 97. Greenish olive; dark nuchal spots, and vertebral dots, whitish below.

China; rare.

DENDROPHIS.

Body and tail very elongate,, slender, compressed. Eye large. Head shields regular. Scales 13—15, smooth, imbricate, the vertebral series large, polygonal. Ventrals nearly square at the keels.

D. PICTUS.—*The blue tree-snake.* Scales 15. Ventrals 160—187, subc. 100—156. Eye moderate (or large when young). Colour rather variable; either deep blue with a bright yellow lateral stripe, ventrals yellowish with a lateral spot at regular intervals (Malabar) or, bronze with blue margins to the scales under the imbrication, yellow belly and outer scales, with dark lateral stripe from eye to vent. (Burma).

Common in India and Burma.

D. CAUDOLINEATUS.—Scales 13 Ventrals 183—188, subc. 105—110. Bronze, with black lateral stripe, two dorsal posterior stripes, superior and inferior median caudal stripe.

CHRYSOPELEA.

Body and tail slender and elongate; head elongate, snout rounded. Head shields regular. Scales 15—17, smooth, rhombic. Ventral keels sharp, with a notch at the hind margin.

C. ORNATA.—*The black and gold tree-snake.* Scales 17. Ventrals 180—236, subc. 96—147. Head black with yellow punctulated crossbands; body black with a flowered pattern, formed by bright yellow dots on each scale, or with yellow punctulated crossbars. Length 2—4 feet.

More common, I think, in Burma than in India.

C. RUBESCENS.—Scales 15. Ventrals 187—225, subc. 108—146. Purple, dotted with brown and black spots; head with brown stripes.

Straits.

FAMILY X.—DRYOPHIDÆ.

Body and tail excessively slender; snout much elongated and tapering. Eye moderate with *horizontal pupil.* Head shields *normal*; nostril in a single nasal. Scales 15—17, narrow, much imbricate; the vertebral series large, fan-shaped. Ventrals broad, not much keeled. Anal *bifid*. *Tail often nearly as long as the body.*

TROPIDOCOCCYX.

Snout tapering, but without any appendage. *Loreal none.*

T. PERROTETI.—Scales 15, smooth, last dorsals sometimes keeled. Ventrals 140, subc. 70—82. Grass-green; yellow lateral stripe; belly yellowish.

Nilgiris.

TRAGOPS.

Snout very long, but without any appendage. *Loreal present*, its region concave. Scales 15.

T. PRASINUS. Ventrals 212—234, subc. 176—203. Colour variable, generally green *with white lateral stripe; a* not uncommon variety is light ochre, belly white with a lateral ochre stripe, under the tail yellow with white lateral stripe.

Bengal, Burma.

T. DISPAR.—Ventrals 151 + 100. Males bright green, females bronze-coloured; black interstitial skin; yellow lateral stripe.

Anamullies.

T. FRONTICINCTUS.—Ventrals 190 + 140. Rostral small, nasals elongate, contiguous. Grass-green or bronze, with black yellow-edged lateral stripe.

Swamps in Arakan.

PASSERITA.

Snout very long, *ending in a flexible appendage; no loreal;* antocular region concave. Head shields regular. Scales 15.

P. MYCTERIZANS.—*The common green tree-snake.* Ventrals 172—188, subc. 140—166. Grass-green, with yellow lateral stripe; paler below; black and white crossbands, on the interstitial skin. Length 4—6 feet. This is the most common tree-snake, and is sometimes called the "eye-snake" in consequence of an idea prevalent amongst otherwise sane Englishmen that it is in the habit of hanging by the tail from a branch of a tree for the purpose of hitting passers-by in the eye.

P. PURPURASCENS.—Ventrals 194 + 154. Brownish grey, marbled with purple and dotted with brown.

Ceylon.

FAMILY XI.—DIPSADIDÆ.

Tree-snakes with vertical pupil, short broad head, very distinct from neck, body compressed, elongate. Head shields regular Scales smooth, imbricate, the vertebral series enlarged. Anal entire. Last tooth elongate and grooved; the front tooth also elongate sometimes.

DIPSAS.

D. CYNODON.—Scales 23. Ventrals 275—287, subc. 141—162. Anterior palatine and mandibulary teeth enlarged. Brown; dotted with black, and with rhombic black crossbands; or reddish olive with a vertebral series of large black ocellate spots.

Burma, Straits.

D. FORSTENI.—Scales 25—27. Ventrals 260—275, subc. 106—131. Teeth as in the preceding. Brownish olive, with black fasciolated cross-bands; median and lateral black head stripes.

Anamullies; very rare.

[The anterior palatine and mandibulary teeth of the following species are but little enlarged if at all.]

D. BOOPS.—Scales 21 Ventrals 265+160. Eye very large. Reddish olive, spotted with black and brown in transverse and longitudinal bands; belly marbled with purple.

Bengal, Straits ; rare.

D. DENDROPHILA.—Scales 21. Ventrals 211—229, subc. 90—112. Black, iridescent, with numerous narrow yellow crossbands ; throat yellow ; belly black, or marbled with black.

Straits.

D. BUBALINA.—Scales 21. Ventrals 219—252. Green above, greenish olive below ; black interstitial skin.

China or Assam ; rare.

D. MULTIMACULATA.—*The ring-spotted tree-snake,* or *the Burmese brown tree-snake.* Scales 19, sometimes 17. Ventrals 202—245, subc. 80—106. Dark fawn with a numerous dorsal series of round dark spots with black and white margin ; head with a black ⊳ and postorbital streak ; the spots often have black pendants and alternating small dots ; belly white mottled with fawn. Length 2—3 feet.

Burma, Straits, China. In Burma it appears to replace *D. gokool.*

D. TRIGONATA.—Scales 21. Ventrals 235—269, subc. 79—87. Yellowish olive, with a yellow black-edged irregular vertebral stripe. Head with a broad black ⊣, and postorbital streak ; belly white with lateral brown dots.

Common in India.

D. MULTIFASCIATA.—A variety of the preceding. A solitary museum specimen.

D. GOKOOL.—*The common brown tree-snake.* Scales 21, vertebrals much enlarged. Ventrals 224+90. Yellowish or greyish brown, with a series of irregular buff vertebral dots, from the sides of each of which drops a black fasciolated Y mark; belly yellowish, with black lateral dots; the head has a broad black arrow mark, divided in front by a yellow median line which bifurcates behind enclosing a large round spot.

Common in Nagpore.

D. CEYLONENSIS. Scales 19. Ventrals 220 + 108. Grey, with black vertebral spots, each emitting a down-streak; black head blotch and post-orbital streak.

FAMILY XII.—LYCODONTIDÆ.

Body moderate or slender, head distinct, moderate, with depressed and elongate snout. Eye small, generally with vertical pupil. Head shields regular. A large fang (harmless) in front, both in the upper and lower jaws.

These snakes are a degraded family of *Colubridæ.*

LYCODON.

Body rather flattened, head distinct, depressed, with flat spatulate snout. Scales 17, smooth. Pupil erect.

L. AULICUS. *The Flat-nosed Brown Snake.* Ventrals 183—209, subc. 57—77. Anal bifid. Antocular reaches the vertical.

Eye small and beady; so black that it is nearly impossible to distinguish the pupil. Colour chocolate brown with numerous white or yellowish cross-bands decussating laterally; the first forms a broad collar; belly white with interstitial flesh colour. Length 1—2 feet.

A common snake everywhere; it is often found climbing the angle of the jamb of a door, or about dark places in godowns. It is of uncanny appearance, but is perfectly harmless.

L. LAOENSIS. Ventrals 185 + 68. Snout shorter and posterior frontals much shorter than in the preceding. Black with white cross-bands.

Siam.

L. STRIATUS. Ventrals 167—174, subc. 46—48. Ante-ocular does not reach the vertical; posterior frontal short; otherwise much like *L. aulicus*.

South of India, Anamullies.

L. ANAMALLENSIS: Ventrals 202 + 74. Anal entire. Two loreals. Greyish brown with white brown-edged cross-bars.

A single specimen (Major Beddome).

L. RUFOZONATUS. Ventrals 200 + 72. Loreal enters the orbit. Anal entire. Crimson, dotted and cross-banded with brown; head shields marked with yellow; brown post orbital streak. Stout, above 3 feet.

China.

TETRAGONOSOMA.

Head shields regular; *loreal none.* Scales smooth, 17. Ventrals above 200, angulated. Anal entire.

T. EFFRENE. Ventrals 215—228, subc. 72—101. Black above and below, with complete buff rings, and buff labial streak.

Solitary museum specimen from Penang.

T. ATROPURPUREUM. Ventrals 257 + 91. Purple, marbled with black and white.

Solitary museum specimen from Tenasserim.

LEPTORHYTAON.

Loreal present; *nasal single,* pierced by the nostril. Scales 17, smooth. Anal bifid.

L. JARA. Ventrals 167—175, subc. 56 + 63. Brown, each scale with two white dots; generally a white-collar, belly white.

Assam, Ganjam, Anamullies.

OPHITES.

Loreal present; antocular sometimes absent. Scales 17, *keeled*. Anal bifid.

O. SUBCINCTUS. Ventrals 198—221, subc. 69—82. Loreal enters the orbit, re-placing the antocular. Black, with whitish cross-bands and collar.

Straits.

O. ALBOFUSCUS. Ventrals 256 + 204 (tail $\frac{1}{3}$). Antocular present. Light reddish, with broad brown cross-bands; reddish white collar.

Straits.

CERCASPIS.

Scales 19, strongly keeled. Ventrals angulated; *subcaudals entire*.

C. CARINATA. Ventrals 188—193, subc. 53—60. Black, completely encircled by white rings.

Ceylon.

FAMILY XIII.—AMBLYCEPHALIDÆ.

Body and tail slender, strongly compressed, head thick, large, very distinct. Eye moderate with vertical pupil. Nostril in a single nasal; rostral very high. Head shields often increased above the normal number. Cleft of the mouth smaller within than without; lower jaw not expansible; chin shields unsymmetrical, no mental groove. Scales generally smooth, 13—15. Maxilla small, with few and small teeth; other teeth strong.

AMBLYCEPHALUS.

Head short, thick, high, with convex lips. Crown shields have often small shields intercalated; several loreals; a complete orbital ring. Scales 13, smooth, elongate; vertebrals large hexagonal. Anal and *subcaudals entire.* Teeth few; a long anterior palatine and mandibulary tooth.

A. BOA. Ventrals 152—170, subc. 88—112. Loreals 3, one above the other. Purplish, marbled and dotted with brown; cheeks and lips carnation, with vertical subocular streak. Grows to 3 feet.

Straits. Climbs, and lives on insects.

PAREAS.

Cleft of mouth very short. Brown shields regular. Scales 15, generally smooth; vertebrals larger. Anal entire, *subcaudals bifid.* Nasal generally simple.

P. CARINATUS. Ventrals 160—174, subc. 52—74. Resembles *amblycephalus* in its tumid lips and complete orbital ring. Greyish brown, with reticulated black cross-bands; black post-orbital streak.

Java, Cochin-China.

P. MONTICOLUS. Ventrals 194 + 87. Loreal none, replaced by a large antocular; orbital ring of shields incomplete below. Brown, with black nuchal ring and Y shaped cross-bars.

Assam.

P. LÆVIS. Ventrals 150—164, subc. 31—46. Loreal none, replaced by the antocular. Two labials enter the orbit. Brown, marbled with black in irregular cross-bands; belly brown, or white with blackish lateral spots.

Java, Cochin-China, Khasya Hills.

P. MASCULARIUS, resembles *P. carinatus* in its complete orbital circle and general appearance. The young and adult differ in colour, and it is said in the disposition and shape of the head shields. Ochrey brown, with traces of cross-bands. In the young, rich reddish brown with fasciolated cross-markings in white and claret colour; white collar, mottled with claret-red; belly brown, spotted and mottled.

Martaban.

P. MODESTUS. *Theobald.* A band-like subocular. Posterior frontal enters the orbit. Median scales faintly keeled. Uniform brown, pale yellowish below.

Rangoon.

FAMILY XIV.—XENOPELTIDÆ.

Body cylindrical and stout; tail short, tapering; head depressed, not distinct from the neck, rounded. Scales large and polished. Ventrals narrow, the outer row of scales enlarged to nearly half their size. Head shields of scale-like appearance. Eye small. Burrowing snakes transitional between the small earth-snakes and the pythons.

XENOPELTIS.

Head shields simulating scales; anteocular large; no loreal. Scales 15. Anal and subcaudals bifid.

X. UNICOLOR. *The iridescent Earth-snake.* Ventrals 180, subc. 20—30. Behind the triangular vertical are other similarly shaped large scales. Colour brown, with remarkable iridescent effects; below white or yellowish. Grows to 3 feet, of savage appearance.

Common in Burma and the Straits.

FAMILY XV.—PYTHONIDÆ.

Body rounded; head distinct from the neck; snout long, rounded. Eye moderate, pupil erect. Head shielded. Some of the labials pitted. Scales numerous, smooth. Ventrals narrow. Rudimentary hind limbs visible. Intermaxillary teeth present.

PYTHON.

Body stout; grows to a large size. Occipitals rudimentary; forepart of the crown with intercalated shields. Rostral and labials pitted. Anal entire. Ventrals very narrow.

P. RETICULATUS. *The Malay Python.* Scales about 75. Ventrals 300—330, subc. 82—102. Two or three pairs of shields intercalated between the vertical and posterior frontals. Labials about 15 (7) first 4 pitted. Brown with an irregular vertebral chain of black rings, from each of which depends a black bar enclosing a white ocellus. A thin black line prolonged along the median line of the head; post-orbital streak. Grows to 10 feet and upwards; probably 20 feet is the maximum.

Burma, Straits.

P. MOLURUS. *The Indian Python.* Scales about 65. Ventrals 212—262, subc. 60—72. Intercalated crown shields. Labials about 12, first 2 pitted. A subocular sometimes present. The pattern consists of three rows of quadrangular brown spots (one median), separated by narrow buff lines; or it may be considered as brown with longitudinal dorsal buff stripes with irregular transverse bands above and below. A brown spot formed by a buff or yellow offset of the reticulations occupies the head. Size about the same as the preceding.

India, Burma.

NOTE.—I think that the exaggeration of travellers as to the length of these snakes arises from the disproportionate thickness of adult specimens. I have now a *Python molurus* which in the middle is fully as thick as a stout man's arm; and a person deriving his ideas of proportion from large Colubridæ would naturally suppose, on seeing a snake of this thickness either coiled up or moving through the jungle, that it must be at least 20 feet long; yet it is in reality only 9 feet long, very little longer than a *dhaman* of an inch and a half in diameter. The capacity of these creatures' jaws is also exaggerated. The above-mentioned individual has a throat only wide enough to take in a fish of about 8 inches long; so that it is probable that his prey consists rather of rats and birds than of goats or deer.'

FAMILY XVI.—ERYCIDÆ.

Body moderate, rounded; tail very short; head with a broad snout. Eye small with vertical pupil. Head scaled. Scales small in numerous rows. Ventrals narrow, subcaudals single. Rudimentary hind limbs visible, as in the Python.

GONGYLOPHIS.

Head flat, oblong, scarcely distinct. Scales keeled. Chin scaled, *without mental groove*.

G. CONICUS. Scales 41—47. Ventrals 168—176, subc. 17—23. Small labials, a rostral and nasals are the only head shields; the orbit is surrounded by scales. Grey with an irregular vertebral chain of square brown blotches; belly white. Length 2 feet.

Southern India, Himalayas.

CURSORIA.

Similar to the preceding genus, but with smooth scales.

C. ELEGANS. Scales 36. A solitary museum specimen.

ERYX.

Head hardly distinct, snout obtusely conical, with a sharp transverse edge. Scales keeled. A few small chin shields separated by a *mental groove*.

E. JOHNII. Scales 54—65. Ventrals 194—209, subc. 26—36. A pair of frontals, head otherwise scaled as in *Gongylophis*. Reddish olive; often with irregular black spots.

Southern India, Himalayas.

FAMILY XVII.—ACROCHORDIDÆ.

Body moderate, rounded, or slightly compressed; tail short; head small, not distinct. Eye small. Nostrils superior. Head scaled. Scales small wart-like, tubercular, or spiny. No ventrals.

ACROCHORDUS.

Tail slightly compressed, without any fold of skin below: Each scale with a triangular keel, ending in a spine.

A. JAVANICUS. Nasals simple, contiguous. The mouth has a bull-dog arrangement of the lips, there being a central notch above, and a notch below on either side, with corresponding protuberances. Brown with large confluent dark spots. This extraordinary snake grows to 8 feet, is quite terrestrial (and even frugivorous) though of pelagic appearance and viviparous.

Java, Straits.

CHERSYDRUS.

Tail compressed, and expanded by a fold of skin running along the lower side. Each scale with a short tubercular keel.

C. GRANULATUS. Only the ventral scales are spiny; otherwise like *Acrochordus*. Dark grey above, yellowish below, each colour sending out short alternate cross-bands. Aquatic.

Rivers and coasts of Burma and the Straits.

SECOND SUB-ORDER—VENOMOUS COLUBRINE SNAKES.

FAMILY I.—ELAPIDÆ.

Body moderate, tail rather short. Head shields normal but no loreal. Eye small or moderate, with round pupil. A poison-fang in front of the maxilla (which is but little movable or erectile), and only one or two teeth behind.

NAGA.[*]

Anterior ribs elongate, erectile; skin of the neck dilatable. Head short and rounded. One rudimentary tooth behind the poison-fang. Ventrals less than 200. Anal entire.

---

[*] Usually written *Naja*; as the word is probably derived from *nāg*, I prefer to write it *Naga*.

N. TRIPUDIANS.* *The Cobra.* Scales 21—23 on the four-tenths of the body below the first tenth or expansive portion, but as many as 33 on the broadest portion of the 'hood,' as we must continue to call the expanded neck in default of a better English term. The antocular and the anterior frontal are somewhat fan-shaped, the posterior angle of the latter resting on the broad part of the former. There are two distinct varieties of this snake:—

Variety a. The Binocellate Cobra. The Spectacled Cobra. Scales 23. They are 31—33 at the ocelli, 25 at the black posterior edge of the hood. Ventrals 193—194, subc. 58—67. The neck is marked between the 10th and 17th transverse series of scales with a white, black-edged ⊏ or ⊲ enclosing at either extremity a black ocellus. This pattern is entirely on the steel-brown skin, and is only seen when the hood is expanded; then the scales are distant from one another like grains of linseed symmetrically arranged in rows; at other times the scales are imbricate and conceal the pattern. The general colour is a dark brown with, occasionally, black and white bands on the interstitial skin. Belly ash or dark mottled, with a lateral spot corresponding to the position of the ocellus above, and four or five ventrals (the 18th—23rd) black. Some cobras are much lighter in colour; I had one at Calicut which was very nearly white, with the spectacles faintly marked; it was much respected as a raja amongst cobras.

This binocellate variety is found in the South of India and on the coast generally. I found two specimens in Burma; but, from their being deprived of fangs, they had evidently been imported by jugglers and had escaped. My largest specimen was 5 feet 7½ inches.

---

* *Tripudiate*, v. i. to dance on the toe (*Hyde Clarke's English Dictionary*) Ex. "tripudiant nations"—(*Saturday Review*)

Variety b. (θ of Gunther). *The Monocellate Cobra.* Scales 21; they are 25—27 at the ocellus. Ventrals 185—191, subc. 53. Instead of spectacles, this variety bears a plain white ocellus with black centre and margin. The colours are very much the same as in the other variety. This one does not grow to so large a size, 4 feet 6 inches being the length of my largest specimen. It is the cobra of Central India and Burma.

OPHIOPHAGUS.

The neck is dilatable, but to a much less extent than in *Naga*. Occipitals surrounded posteriorly by three pairs of large shields, the two anterior being temporals. Scales smooth, large, 15 rows. Ventrals above 200.

O. ELAPS. *The Hamadryad.* Scales 15; on the hood there are about 19. Ventrals 215—262, subc. 80—100; about the first ten subcaudals are entire, and sometimes the last few ventrals are two-rowed. There are two varieties distinguished by the Burmans, the dusky and the banded. The former is of general brownish olive colour. The latter is yellow with about 50 bands formed by black interstitial skin and black margins to the scales, the latter increasing until towards the tail the colour becomes black with yellow bands. Lower parts yellow, posteriorly black.

This snake grows to 12 feet in length; when at bay its head stands about two feet off the ground. From its large size it is much less manageable than the cobra, but Burman jugglers make it go through much the same performance. It will eat other snakes, and there appears to be enmity between it and the cobra, the latter (I am credibly informed) attacking it with fatal effect. When watching its eggs it is very savage, and will drive away by hostile demonstration, or even pursuit, any passers-by; at other times it is peaceable enough. It is found in the jungles of Cuttack and Burma, and in the Anamullies.

BUNGARUS.

Tail short, head small, hardly distinct from the neck, the skin of which is not dilatable. Eye small. Scales 15, smooth, *the vertebrals large and hexagonal.* Ventrals above 200. Anal and *subcaudals entire.* One or two teeth behind the poison fang.

B. CÆRULEUS. *The White-arched Bungarus.*[*] Ventrals 201—221, subc. 38—56. Upper parts jet black; lower parts white, throwing white arches over the back. (Hence *B. Arcuatus* is a far preferable name, as there is not the slightest cærulean colour about the snake). The first arch is generally an incomplete collar, the next three are single; then they divide into pairs, of which there are about 30. There is great variety about the mode of sub-division; sometimes the arches remain single, and in one variety there are no arches. This snake grows rarely above 4 feet long; young specimens are very handsome. It is found in most parts of India, but is rare in Burma, where it is re-placed by the following:—

B. FASCIATUS. *The Yellow-banded Bungarus.* Ventrals 200—233, subc. 23—37 Tail very short and stumpy, even swollen at the tip Body of triangular section; spinous processes of vertebræ very prominent. Black with about 20 yellow cross-bands completely encircling the body and tail, Head black with a yellow ▷ converging upwards from the throat. Grows to above 6 feet long. Common in Burma, rare on the Eastern Coast.

B. CEYLONICUS. Similar to the first species, but with complete black rings and narrow white intervals.

---

[*] Probably the "krait;" only every Anglo-Indian has his own idea of a "krait," often evolved from his inner consciousness, so that there is no certainty on the point.

B. SEMIFASCIATUS. Also similar to *B. cæruleus*, but the tail has complete black rings round it.

China.

XENURELAPS.

Similar to *Bungarus* but with double subcaudals.

X. BUNGAROIDES. Scales 15. Ventrals 237+46. Black with narrow white cross-bands directed forward; white bands on the head; belly white with irregular cross-bands.

Assam. A solitary museum specimen.

MEGÆROPHIS.

Form similar to *Bungarus*, but with 13 rows of scales, the vertebrals large, hexagonal. Anal and anterior subcaudals entire.

M. FLAVICEPS. Ventrals 200—226, subc. 38—52. Black, with a vertebral line and zigzag lateral stripe, white anteriorly, red posteriorly; head and neck red; belly red, sometimes black anteriorly.

Straits.

CALLOPHIS (ELAPS.)

Body very long and slender; head short, obtuse, not distinct from the neck; tail short. Scales 13, *vertebrals not enlarged;* anal generally bifid; *subcaudals bifid.*

C. BIVIRGATUS. Ventrals 248—284, subc. 38—50. Head, belly, and tail red; body black, with a lateral zigzag white blue-margined stripe. Upwards of 4 feet in length.

Straits.

C. INTESTINALIS. Ventrals 223—271, subc. 21—26. A red, black-edged vertebral stripe; a buff, black-edged lateral stripe. Belly alternate pale yellow and black.

India, Straits.

C. GRACILIS. Ventrals 238—311, subc. 21—28. Grey, a brown vertebral line with small button-like swellings; a white, black-centred, and black margined lateral stripe; between these stripes is a series of black, white-edged spots; belly pale yellow with black cross-bands; tail red below, with an anterior and posterior black, white-edged ring.

Straits.

C. MACCLELLANDII. Ventrals 196—224, subc. 25—34. Head black with a yellow fillet; body reddish brown with black vertebral line; belly yellow with variable black pattern.

Assam.

C. ANNULARIS. Ventrals 208+33. Head black with a yellow fillet; body reddish brown, surrounded by about 40 narrow black rings; on the belly these are doubled by alternate ventral cross-bars.

C. TRIMACULATUS. Ventrals 258—274, subc. 35. Brown, head and neck black with yellow spots; belly red.

Tenasserim.

C. MACULICEPS. Ventrals 205—247, subc. 24—32. Brown; 3 black lines run from the snout to join a broad black collar; belly red; tail black-ringed.

Straits.

C. NIGRESCENS. Ventrals 232—247, subc. 33—42; anal generally entire. Upper parts blackish, lower parts red; head marbled with black; a black ⊲ collar; a black, yellow-edged dorsal line.

Anamullies.

FAMILY II.—HYDROPHIDÆ.

Body cylindrical, compressed posteriorly; tail strongly compressed, forming a vertical fin. Head shields pretty regular, but no loreal, and usually only a single pair of frontals; nasals generally contiguous. In most genera there are no ventrals. Scales generally tubercular and dull. All provided with a poison-fang, followed by 3 or 4 ordinary teeth. Eye very small.

PLATURUS.

Head shields normal; 2 *pairs of frontals,* nostrils lateral, nasals not contiguous. Scales smooth, *ventrals well developed,* anal bifid; subcaudals present.

P. SCUTATUS. Scales 21—23. Ventrals 213—241. Generally an azygos shield between the posterior frontals. Black rings, head yellow with black postocular stripe and median stripe.

P. FISCHERI. Scales 19. Ventrals 232—241. No azygos shield. About 30 black rings, and median head stripe.

AIPYSURUS.

Body not much compressed; the ventrals are well developed, and have a *sharp median keel.* Head shields generally divided; one pair of frontals; nasals contiguous. Scales smooth, subcaudals broad, entire.

Belongs to the Polynesian fauna.

A. ANGUILLÆFORMIS. Scales 17. Ventrals 142. Brown with yellow cross-bands.

A. LÆVIS. Scales 21. Ventrals 151 151.

A. FUSCUS. Scales 19. Ventrals 157—166. Brown.

DISTEIRA.

A pair of anterior frontals between the nasals. Scales imbricate; ventrals very small with *double keel.*

D. DOLIATA. Scales 39—41. Ventrals 234. Brown cross-bands. A solitary museum specimen.

ACALYPTUS.

Crown scaled; a pair of frontals, nasals contiguous; no ventrals.

A. SUPERCILIOSUS.

Rare; found in the Pacific.

HYDROPHIS.

Head short, shielded. One pair of frontals, *nasals contiguous.* Scales generally tubercular. Ventrals rudimentary or absent. (They are said to be 'broad,' purely in a comparative sense.)

This extensive genus comprises by far the greater number of the sea-snakes met with. The range of these animals being unlimited by the circumstances which confine land-snakes to particular localities, it may fairly be said that every sea-snake of the Indian and Pacific oceans may be found on the East Indian coasts; therefore these individuals not actually found on these coasts are still included in the East Indian fauna. I may here mention that 6 to 7 feet is the adult size of the largest of the species at present known. Günther makes no less than 35 species of this genus. Their colour is generally buff or dirty white, with black or dull sea-blue cross-bands. Ventrals, when present, number from 220—440. As their description takes up twenty pages of Günther's book, and I am afraid that the work of discrimination, already difficult, would not be possible by the aid of any synopsis, I must fain refer the collector to the original descriptions. *H. cyanocinctus, cærulescens, gracilis,* are about the most common.

ENHYDRINA.

Differs from *Hydrophis* in having a deep notch in the lower jaw.

E. BENGALENSIS OR VALAKADYEN. The rostral is lobulated and fits into the deep mental notch.

Common on the Burman coast.

PELAMIS.

Head flat, with *long spatulate snout*, a pair of frontals, nasals contiguous; no ventrals.

P. BICOLOR. Black above, brown below, with a yellow lateral band.

All this family of snakes are very venomous. At Maulmain several sailors have died in consequence of being bitten whilst bathing; this is contrary to their usual habits. I have always found them stupid, peaceable, and nearly blind when out of the water.

THIRD SUB-ORDER.—VIPERINE SNAKES.

FAMILY I.—CROTALIDÆ. *

Body stout, tail moderate or short. Head broad, subtriangular, generally scaly or imperfectly shielded. A deep pit on the side of the snout corresponding to the cavity of the maxilla. Eye moderate, with erect pupil. Poison-fang long, more or less erectile but without a special erector muscle.

TRIMESURUS (Trimeresurus, *Günther*).

Head shielded only in the supraciliary and rostral regions. *Body and head covered with more or less keeled scales*; 17—27 rows. Anal entire, subcaudals double.

T. GRAMINEUS. In this and the following five species the second labial forms the front of the facial pit. The small supranasals are separated by a small azygos shield. Scales 19—21. Ventrals 158—170, subc. 58—71. Grass green, belly paler, yellow lateral stripe.

Burma, Straits, China, Assam.

---

* This family includes the rattlesnakes of America, and most of the poisonous snakes of Australia and the West Indies.

T. ERYTHRURUS. Scales 21. Ventrals 150—164, subc. 54—70. Supranasals contiguous. Same colour as the preceding, tail red or ruddy, lips often white

Bengal, Burma, China.

T CARINATUS. Scales 23—25. Ventrals 161—167, subc. 45—68. Head scales small, strongly keeled; supranasals not contiguous. Grass green, paler below, with or without a white lateral stripe, tail often reddish, belly often white. Grows to about 3 feet long.

Burma, Assam.

I consider that the above three species are merely varieties of a species. *T. viridis*, the green tree-viper. Their colour is delicate and variable; the keeled scales, the reddish tail, and the side stripe may be present or absent in either of these varieties.

T. PURPUREUS. Scales 25—27. Ventrals 162—171, subc. 65—70. Dull reddish brown, pale green on the sides, yellow lateral stripe, ventrals and subcaudals marked with brown.

Straits.

T. ANAMALLENSIS. Scales 21, more or less keeled. Ventrals 148—158, subc. 51—55. Supranasals generally separated. Yellowish green, with vertebral series of rhombic black spots variegated with yellow. Head marbled with black, postorbital streak.

Anamullies and Wynaad.

T. MONTICOLA. Scales 23, slightly keeled. Ventrals 137—141, subc. 41. Dark ash or brown, alternating dorsal series of black spots; sides black-spotted, yellow-post orbital streak; yellow ⋈ mark on the neck,,belly mottled brown.

Himalayas.

T. STRIGATUS. Scales 21, keeled. Ventrals 136-- 142. The second labial does not form the front of the facial pit. No supranasals. Brown with irregular dark spots and angular mark on the neck.

Nilgiris. Formerly *Trigonocephalus nilgiriensis*.

T. WAGLERI. Scales 23—25. Ventrals 139—150, subc. 42—53. The second labial does not form the front of the facial pit. Head scales keeled. Variable in colour; when young, green with short, reddish buff cross-bars; the adult is black with about 35 yellow cross-bands; yellow post-orbital streak.

Straits. Formerly *Trigonocephalus sumatranus*.

T. TRIGONOCEPHALUS. Scales 17—19. Ventrals 147—152, subc. 57—63. The ante-anal is notched or divided. Green with black vertebral stripe emitting alternate cross-bars; black post-orbital and head streaks; pale green below.

Ceylon.

T. MUCROSQUAMATUS. Ventrals 219+91. Brownish grey with black ring-spots.

Assam. A solitary museum specimen.

T. ANDERSONI AND T. OBSCURUS are noted by Mr. Theobald, but they would appear to be varieties of *T. purpureus* and of *T. wagleri* respectively.

PELTOPELOR.

Head covered with large shield-like imbricate scales.

Body scales 12, large, keeled.

P. MACROLEPIS. Ventrals 134—138, subc. 53—56. The large head scales are arranged very much like shields, there being a vertical and frontals. Uniform green, paler below with yellow side streak.

Discovered by Major Beddome in the Anamallies.

CALLOSELASMA.

Head normally shielded. Scales 21, *smooth.* Tail ends in a long spine.

C. RHODOSTOMA. Ventrals 138—156, subc. 36—54. A subocular present. Reddish olive, dotted with brown; black vertebral line; dorsal series of erect triangular black spots; flesh-coloured streak from the snout above the eye; lips reddish olive. Grows to 3 feet.

Siam, Java.

HALYS.

Head normally shielded. Scales 21—27 *keeled.* Tail ends in a long spine.

H. BLOMHOFFII. Scales 21. Ventrals 136—150, subc. 43—56. Three large temporals separated from the occipitals by scales, and contiguous to last 3 labials. Brown, with a dorsal series of large, round dark spots; belly marbled brown.

Japan.

H. HIMALAYANUS. Scales 23. Ventrals 162—166, subc. 43—51. Temporals separated from occipitals by scales, and confluent with the last 3 labials. Dark brown, with band-like spots; black post-orbital streak; belly black, marbled with yellow.

H. ELLIOTTII. Scales 23. Ventrals 151—43. Green, white below.

Nilgiris. Found and partially described by Mr. Jerdon.

HYPNALE.

Snout covered with numerous small shields; crown normally shielded. Scales 17 keeled. Tail ends in a small conical scale.

H. NEPA. Ventrals 140—152, subc. 31—45. Brown, grey, or olive, with a dorsal series of dark spots. Sides and

Belly mottled with brown; brown post-orbital streak with whitish upper margin.

Ceylon, Malabar, Anamullies.

FAMILY II.—VIPERIDÆ.

Body stout; tail short; head broad, scaled or imperfectly shielded. No facial pit. Eye moderate with erect pupil Poison-fang very long with a special erector muscle.

DABOIA.

Nostrils large, *in 3 shields*; head completely scaled Body scales 29—31, much imbricate, strongly keeled.

D. ELEGANS, (russellii) *The Chain-viper* (*Tic polonga* of Ceylon, *Cobra monilla* of the Portuguese.) Ventrals 163—170, subc. 45—60. Grey with 3 series of large black white-edged ring spots, the vertebral series often irregular. In young specimens the spots have a beautiful velvetty lustre. A yellow ▷ converges towards the snout. Belly spotted with brown. Grows to 5 feet long.

South of India and Burma. Common.

ECHIS.

Head scaled; *a pair of very small frontals*; nostril small in a *single shield*. Scales 25—29 strongly keeled, much imbricate. Subcaudals single.

E. CARINATA. Ventrals 149—154, subc. 21—26. Grey, with a vertebral series of white, brown-edged spots, below each of which is a semi-circular white streak enclosing a brown spot. Broad brown ▷ head-mark; belly white, spotted. 1—1½ foot.

South of India.

[The viper of England is *Pĕlias berus*.]

APPENDIX.

ON THE FREQUENCY AND PROPORTION OF THE KINDS OF SNAKES MOST COMMONLY MET WITH.

In the foregoing catalogue I have given English names to those snakes most commonly met with, and the small number of these names shows how narrow is the circle of snakes with which the average Englishman in India is at all likely to make acquaintance, and how few of them are venomous. I think it may be of use to give a list of these snakes together, and to give a rough idea of the proportion of each of them likely to be found in a promiscuous collection of a hundred snakes.

	Proportion per cent.
1st.—Venomous Snakes.	
Naga tripudians—the Cobra	5
Bungarus arcuatus—the White-arched Bungarus.	3
Trimesurus viridis—the Green Tree-viper. *Daboia elegans*—the Chain-viper.	*1
2nd.—Harmless Snakes.	
Ptyas mucosus—the Dhâman	20
Tropidonotus quincunciatus—the Checkered Snake....	15
T. stolatus—the Chameleon Snake ...	20
Dendrophis pictus—the Blue Tree-snake ...	2

---

[*] I may remind the reader that the first two of the four common venomous land-snakes have *shielded* heads like the harmless colubrine snakes, whilst the two vipers have *scaly* heads. The latter are rare out of Burma, Malabar, and hilly jungles. Various kinds of *Hydrophidæ* are also common on our coasts.

	Proportion per cent
sserita mycterizans—the Green Tree-snake	4
ipsas gokool—the Broad-headed Tree-snake (striped)	2
codon aulicus—the Chocolate-coloured Snake	10
tal percentage of these common snakes	82

eaving 18 as the proportion of rarer snakes. In Burma foregoing are increased or re-placed by the following es :—

ngarus fasciatus—the Black and Yellow Bungarus	3
motes cruentatus—the Coral-tail Snake	10
bicatenatus—the Filleted Ground-snake	10
mpsosoma radiatum—the Red Dhâman	5
yas korros—the Slender Dhâman	10
psas multimaculata—the Broad-headed Tree-snake (ring-spotted)	5
nopeltis unicolor—the Iridescent Earth-snake	3

last postscript, and I have done.

cording to my experience, the poison of venomous snakes s not only harmless snakes but also venomous snakes of genera. This question is not yet settled, as snakes ot quarrelsome amongst themselves, and great doubts s exists as to the efficacy of involuntary bites.

THE END.

ADDENDA.

Some of the English synonyms in the Appendix have inadvertently been given differently from those in the Descriptive Catalogue.

The first footnote at page 41 was written previously to Dr. Shortt's recent observations on the subject.

I have lately found that the *Trimesuri* included under the head of the green tree-viper' have very weak poison, insufficient to kill a small dog; so that the common snakes possessing poison fatal to man may be reduced to two—the cobra and the chain-viper.